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The Illinois U Library

IRON AGE

MAY 6, 1948



WEAN

ENGINEERING

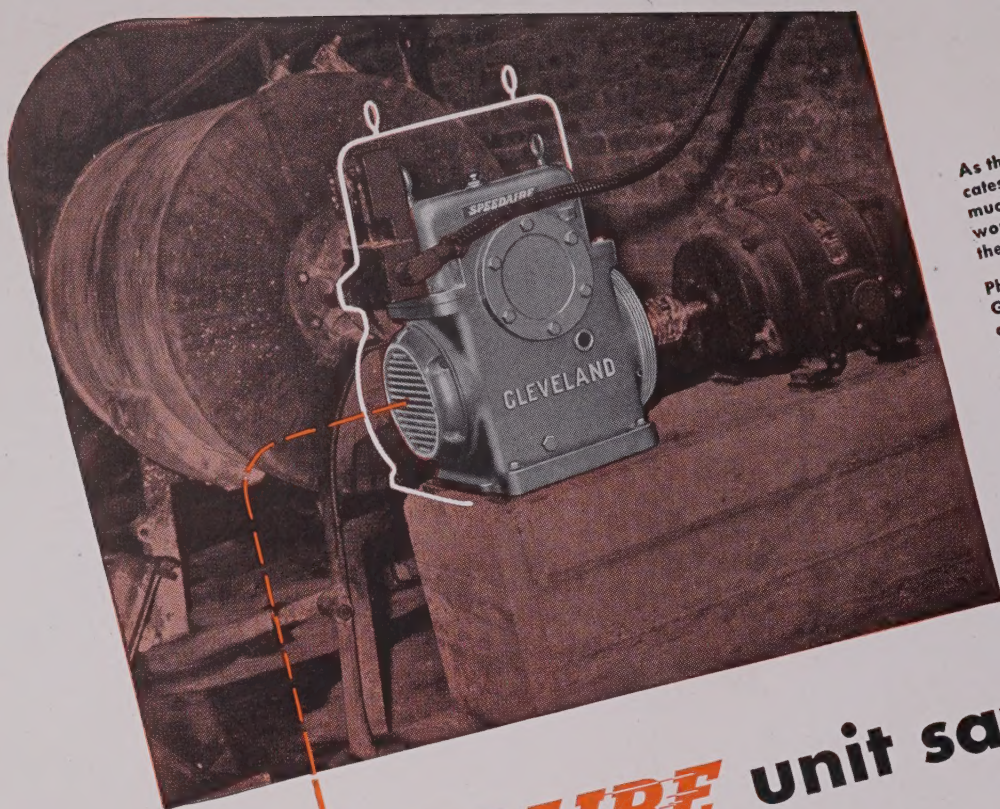
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AND WIRE MILL
MACHINERY

HOLMQUIST
BARBED WIRE
AND
WIRE FENCE
MACHINERY



As the white outline indicates, a standard unit of much greater frame size would be required to do the work of Speedaire.

Photo by courtesy of James Graham Mfg. Co., Newark, Calif., manufacturer of Wedgewood ranges.

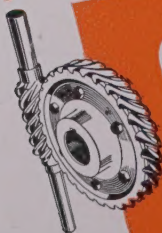
Each **SPEEDAIRE** unit saved \$243

THE Speedaire shown here is operating a pebble mill, grinding enamel for use in the manufacture of kitchen ranges—one of two such installations at this plant. This job would have required a conventional worm gear drive nearly three times as large as Speedaire, weighing more than twice as much. By installing the smaller, more powerful speed reducer, the company saved \$243 per unit.

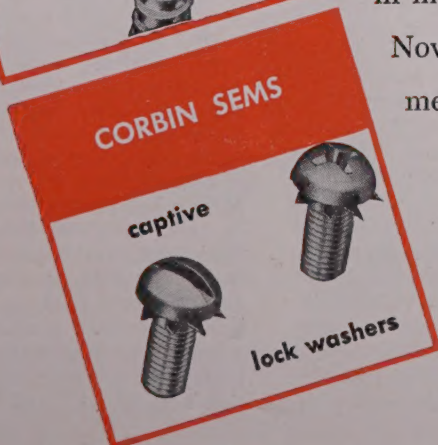
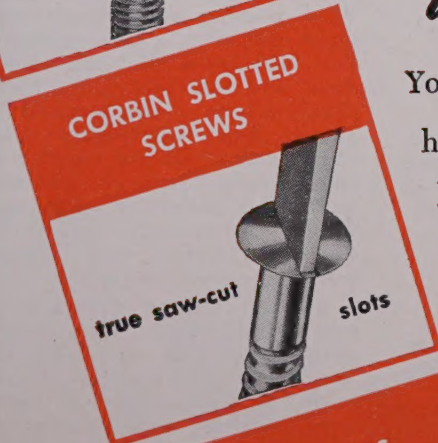
Speedaire is Cleveland's new fan-cooled worm-gear speed reducer. Because it is fan-cooled, Speedaire will do more work—will deliver up to *double the horsepower* of standard worm units of equal frame size, at usual applications where other types have been used heretofore—giving you the advantage of a compact right-angle drive. Speedaire gives the same long, trouble-free service characteristic of all Clevelands.

For full description, send for Catalog 300. The Cleveland Worm & Gear Co., 3252 East 80th St., Cleveland 4, Ohio.

Affiliate: The Farval Corporation, Centralized Systems of Lubrication. In Canada: Peacock Brothers Limited.



CLEVELAND
Worm Gear
Speed Reducers



Pick up Production

with Uniform **CORBIN** *Screws*

You can pick up faster than you can pick out! Grab a handful of screws, set them, drive them — and grab another handful! That's the sort of *pick up* you get with Corbin Uniform Quality. Never a worry about culls or duds because Corbin Screws are quality-checked at every step in manufacture.

Now available in metals, finishes, types and sizes to meet your needs. Ask about Corbin Sems.

6-83

CORBIN SCREW DIVISION

THE AMERICAN HARDWARE CORPORATION
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in making
of your
screw
machine
parts
and
complete
products



Our men have
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years of ex-
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Enlist their
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the next time
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screw machine
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Send us your
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3/64" to 5 1/2" dia.

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Electrical controls
Pressure gauges
Valves
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Cranes
Rock crushers
Cement mixers
Turbines
Generators
Lawn mowers
Door locks
Door hinges
Power tools
Thermostats
Carburetors
Typewriters
Cameras

Fatigue Cracks

BY C. T. POST

Impact

• • John L. Lewis is chastened from time to time, but when he's on the rampage the psychological impact of those bushy brows and miner minions on the nation's sub-conscious is tremendous.

At the fag end of the recent strike Peter Roberts, National Broadcasting Co. newscaster, was polishing off the Lewis trial, declaring that "... the steel industry is saying plenty about the strike. The magazine UNION (sic) AGE, a trade paper, says the coal walkout has cost the steelmakers 1,400,000 tons in production with still more loss expected."

Of course he was referring to your favorite family journal, whose pithy sayings are quoted more times over the air and in the press than any publication we've been able to discover. Your f.f.j. has been confused before with R. & H. (a brand of beer) and ion etch (which has something to do with metal finishing), but Mr. Roberts' slip is the most ironical yet. We chalk up one more grudge against John L. Lewis.

Quick Change

• • Under the heading, "Changes Name," your favorite family journal recently reported:

"The Mathieson Alkali Works, New York, has changed its name to the Mathieson Chemical Corp. for the purpose of identifying the company with its increasingly diversified line of products."

Chances of mistaken identity would be far less if someone brought the old and respected Mathieson Alkali Works into this.

Muskrat Stew

• • Sloss-Sheffield Steel & Iron Co. ("personalized pig iron; Sloss All-Ore pig iron is known all o'er") publishes a remarkable little magazine known as "Pig Iron Rough Notes." Along with learned bilingual dissertations on "Phosphorous in Cast Iron" and "Molding and Core Sand Control Through Binder Selection," a section on recipes for gentlemen cooks caught our eye. The featured recipes were Muskrat Stew, which started out "Skin, decapitate and remove entrails, being careful not to puncture musk gland . . ." and wound up with a footnote that "readers who may not have muskrats run-

ning around their front yards can easily substitute veal or lean pork with excellent results." This shook us a little bit. We don't have any muskrats running around our front yard, and despite the friendly substitute suggestion we aren't going to try pigs again. They insist on getting under the front porch and rooting the foundations.

The other principal recipe in the issue we saw was for "Hushpuppies—Alabama." We expected this one to start out, "Skin a young and noisy fox terrier, decapitate and remove entrails, etc.," but it turned out to be a corn meal concoction, "especially good with fried fish" or with "fried chicken, rabbit, or squirrel." We do have some squirrels running around our front yard, so we'll be looking forward to instructions for squirrel stew in the next issue. Or can some of our readers help us out before then?

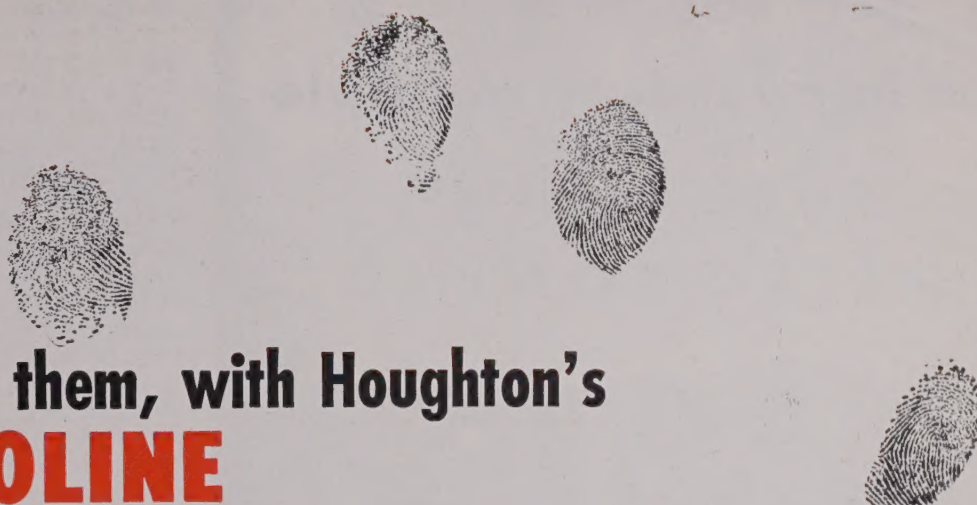
Hands Across the Sea

• • Before the foundrymen retire to the back alley to settle their differences, we should point out that the British and American industries have achieved a fine understanding on technical matters in the past despite variations in terminology and spelling. In an article in the British *Foundry Trade Journal* on aircraft castings we find that "foundability" and "fluidity" mean the same thing. When pouring temperatures come under discussion, a table points out that 1450-1500°C. is "insufficiently fluid" and 1515-1575°C. is "nicely fluid"—a term seldom heard in the U. S. And "ironfoundry" and "steelfoundry" are put together as single words. That is all right with us and far preferable to the way Colonel McCormick's anti-British Chicago *Tribune* runs "frate trains" across its pages.

Misunderstanding always occur over words which have pornographic import in one country and are parlor conversation in the other. A leading British editor writes us that "some 25 years ago American editor 'ticked me off' for using the word 'prostitute' in an editorial. May I now after all these years voice my complaint of the wording of the 7th paragraph of Newsfront, second line, fifth word, in your issue of February 19?" The word was "snafu". The original uninhibited GI translation apparently has stuck in Britain. In this country the meaning is understood in the way that the GI's explained it to their wives: "Situation normal, all fouled up".

FINGERPRINTS BREED IMPERFECTIONS

... arrest them, with Houghton's **COSMOLINE** **FINGERPRINT** **NEUTRALIZER**



Plant men have long since learned that acid fingerprints mean trouble for machined steel surfaces. But they haven't been sure what to do about it.



Here's an excellent answer: a fingerprint neutralizer which leaves a thin oily film (.003" thick) and which is actually a combined rust preventive, cleansing and neutralizing agent. Its high surface tension enables it to displace water.



For rust prevention between factory operations or prior to final packaging, play safe by using No. 266 COSMOLINE Fingerprint Neutralizer, one of the "Famous Nine from the Houghton Line", rust preventives proven in war and in peace. E. F. HOUGHTON & CO., 303 W. Lehigh Ave., Philadelphia 33, Pa.

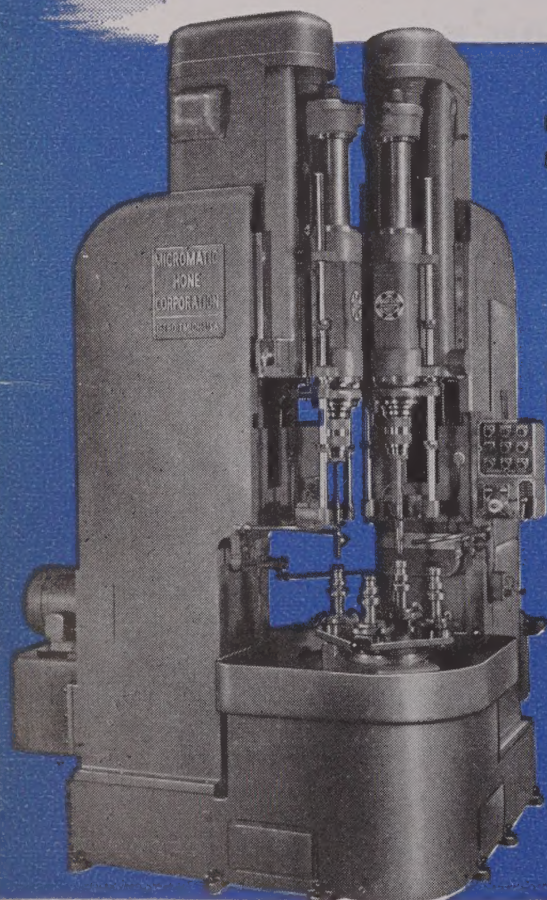
Three plates fingerprinted.
Left—dipped in kerosene;
Center, half submerged in Cosmoline Fingerprint Neutralizer; right, completely immersed, fingerprint gone.

HOUGHTON'S RUST PREVENTIVES

MEMO

*Lets look
into this*

machine for heavy-duty multiple or progressive MICROHONING



★
Removes more stock
in less time.

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maintains closer
tolerances

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**REDUCES
COSTS!**

MODEL NO. 730

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Micromatic now offers a new multiple spindle, unit constructed, Quill type machine with added power and control for removing more and more stock in less time from harder materials. Completely automatic, electronic control of uniform size within .0001 to .0003 inch in production.

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Micromold Manufacturing Div.
Boston Post Road
Guilford, Conn.



Dear Editor:

WHAT IS A PUDDLER?

Sir:

As a point of information to settle an argument, will you define "puddler" for me? My argument is that a puddler works pig iron and ore into balls for subsequent rolling into iron slabs. My opponent claims that a puddler handles steel, because steel is iron refined and combined with carbon.

EDWARD J. ARTHUR

Pittsburgh

• The puddling process is a method of producing wrought iron or malleable iron and has only rarely been used for the production of steel. In a puddling furnace a charge usually starts as pig iron. As the charge melts, a rabble or iron tool resembling a hoe is used to stir the bath. As oxidation proceeds, the carbon content of the bath declines until the charge becomes more and more pasty. About this time, grains of nearly pure iron appear on the surface and it is with this material that the puddler usually works. He puddles the mass of iron until lumps of it weld together into a mass of 100 to 200 lb. each. These balls are removed and squeezed for slag elimination and then are rolled into bars or some other form. So, the puddler essentially handles iron rather than steel.—Ed.

GRAY CAST IRON STRENGTH

Sir:

In the article on "Metallurgy" in the Jan. 1 issue, reference was made to a method of doubling the strength of gray cast iron. We are interested in this development and would appreciate any detailed information you can give us.

D. W. GUNTHER

National Radiator Co.
Johnstown, Pa.

• Suggest you contact the British Cast Iron Research Assn., Alvechurch, Birmingham, England, with any questions you have in mind.—Ed.

HOMO SAPIENS

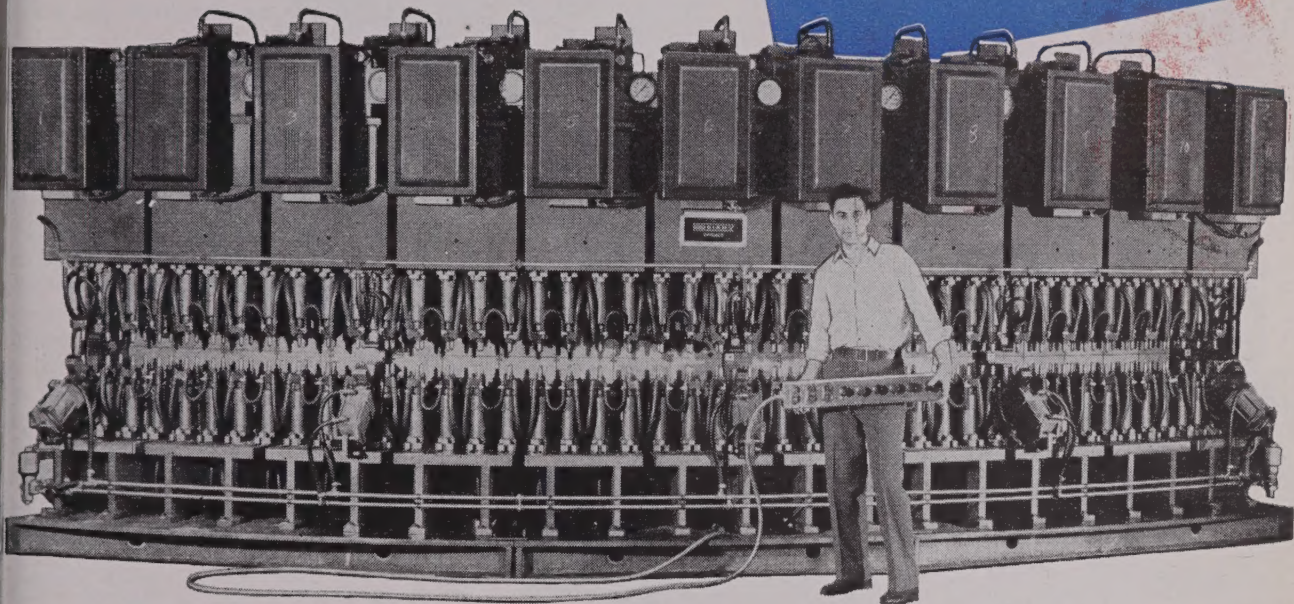
Sir:

The following is new to me—can you tell me the author or the source?

"Man is: A self balancing 28-jointed adapter base biped. An electrochemical reduction plant, integral with segregated stowages of special energy extracts in storage batteries, for subsequent actuation of thousands of hydraulic and pneumatic pumps, with motors attached. Sixty-two thousand miles of capillaries; millions of warning signals,

MAKING A BIG BITE OUT OF COSTS . . .

VICKERS
HYDRAULIC
CONTROLS



88 Spot Welds at ONE BITE



curved steel ribs for Quonset Buildings are now produced on this 88-spot multiple head spot welding machine at rates as high as 85 complete arch ribs in 50 minutes. 88 spot welds at one time take a large bite out of the production costs.

The machine is divided into eleven sections, each complete with its individual Vickers Motorpump (see right) which supplies the oil pressure to the hydraulic cylinders that individually actuate each pair of electrodes. As a result, the electrodes are self-adjusting when tips wear . . . or when variations in stock thickness are encountered. The subdivision into eleven sections also provides flexibility in the event of change in the length or contour of the joist.

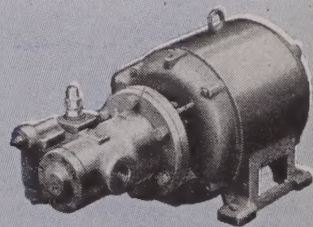
Sciaky Bros. Inc., Chicago, designed and built this unique machine. It is typical of what can be accomplished with Vickers Hydraulics as applied to special purpose high production machines. Consult the Vickers office in your area for information on how Vickers Hydraulic Equipment can improve your machinery.

3472

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VICKERS MOTORPUMP Double Pump and Combination Valve Unit

An exceptionally compact unit containing two Vickers Balanced Vane Type Pump Cartridges with the necessary auxiliary valving to provide the characteristics of a variable delivery pump having two preselected steps. Both low pressure and high pressure are quickly and easily adjusted to meet practically any working condition. Widely used for the numerous applications requiring relatively large oil volumes for fast traverse or fast closing movements, and relatively small volumes for feeding, clamping, holding, etc.

Built for continuous service at operating pressures up to 1000 psi and available in a wide range of size and control modifications. For additional information, ask for Bulletins 38-14 and 46-43a.

THE IRON AGE, May 6, 1948—57

For GAS TIGHT WELDS at HIGH SPEEDS...



EF USES GENEX

WELDS in the heating and cooling chambers of special atmosphere electric furnaces must be gas tight to prevent infiltration of air and escape of the protective gases used in heat treating, bright annealing, brazing and other processes.

The Electric Furnace Company, Salem, Ohio, uses Murex Genex for welding their large gas-tight furnace chambers, some of which are over 150 feet in length. This outstanding E-6012 electrode not only assures sound, tight welds, but also provides real welding economy. Genex can be used at exceptionally high currents without overheating and without excessive spatter. This means higher welding speeds... lower welding costs.

The M & T line includes covered and lightly coated electrodes for downhand and all-position work on mild and low alloy steels, and for stainless steels, bronze and aluminum as well as for hard surfacing and tool and die work. No matter what your problem, there is an M & T electrode to solve it. Write for catalog today.

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railroad and conveyer system crushers and cranes . . . and universally distributed telephone system needing no service for 70 if well managed. The whole mechanism guided with exquisite precision from a turret in which are located telescopic and microscopic selfregistering and recording range finders, a spectroscope, cetera, the turret control being closely allied with an air conditioning intake and exhaust and a main fuel intake.

"Within the few cubic inches housing the turret mechanism there is room also for 2 sound wave and sound-direction-finder recording diaphragms, a filing and installing reference system, and an expertly devised analytical laboratory large enough not only to contain minutes records of every last and continuous event of up to 70 yr experience . . . but to extend, by computation and abstract fabrication, this experience with relative accuracy into all corners of the observed universe. There is also a forecasting and tactical plotting department for the reduction of future possibilities and probabilities to generally successful choices."

ISAAC HARTER
Chairman of Board

Babcock & Wilcox Tube Co.
Beaver Falls, Pa.

• Does any reader place the quotation?—E

CORRECTION

Sir:

I wish to point out an error that occurred in the printing of an article in the April 8 issue, "Powder Metallurgy as Applied to Permanent Magnets." Paragraph 3 on p. 8 reads, "The Alnico alloys were introduced soon after and commercial applications were so great that little effort was spent in further improvement of the Mishima alloy."

The word "Mishima" is incorrect. The alloy to which I referred was the cast alloy exhibiting the magnetic properties listed in the preceding paragraph of the article.

A. E. FRANKS
Plant Metallurgist

Indiana Steel Products Co.
Chicago

SHORT RUN STAMPING DIES

Sir:

We read with considerable interest your article on "Economic Short Run Stamping Dies" in the Feb. 19 issue. We would appreciate any further information that is available on the uses of these Cermet materials. The type of product

LATROBE

ELECTRIC STEEL COMPANY

OFFERS A *new service*

TO TOOL AND DIE STEEL USERS

HARDENED, POLISHED and ETCHED

INSPECTION

discs

here it is!



Complete information on this newest Latrobe service...

Now Latrobe Electric Steel offers another far-reaching service... hardened, polished and etched Inspection Discs cut from bars in your own mill order for DESEGATIZED BRAND Steels.

What this new Latrobe service means to you as a user of tool or die steels is fully described in a timely new bulletin, which...

- 1—shows how these ready-prepared discs help improve production processes;
- 2—illustrates the photographic standards used for making inspection-disc comparisons;
- 3—lists the various steels to which this new Latrobe service applies.

It's a booklet you can't afford to be without... mail the coupon below.

LATROBE

DESEGATIZED
BRAND OF DISPERSED-SEGREGATE

HIGH SPEED STEELS
TOOL & DIE STEELS

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LATROBE ELECTRIC STEEL COMPANY, LATROBE, PA.

Gentlemen: Please send me, without obligation, your booklet on Inspection Disc Service.

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ADDRESS _____

ATTENTION OF _____

TITLE _____

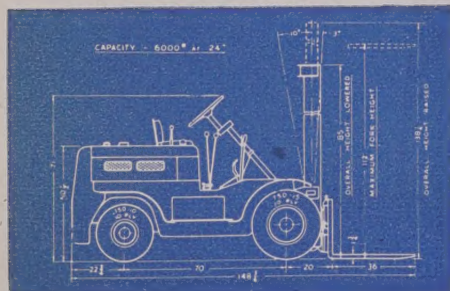
IA-3

MATERIAL HANDLING

News

Here's
BIG / NEWS

CLARK PRESENTS... YARDLIFT "60"



a pneumatic-tired fork truck of 6000 pounds lift capacity, for the BIG jobs of handling the BIG, heavier loads under toughest, roughest conditions — a machine whose BIG-ness is matched by its BIG potential usefulness to Industry.

Does material handling in your business involve carrying heavy loads over rough, uneven, slippery surfaces, indoors or out?

HEAVYWEIGHT CHAMPION

Here's the answer—Clark's YARDLIFT "60," for handling 6000-pound loads on pneumatic tires. This heavy duty machine completes Clark's pneumatic tired "team," developed during 1947—with the YARDLIFT "40" and the YARDLIFT "20," of 4000-lb. and 2000-lb. capacities respectively. Rugged, nimble, steady, these machines revolutionized and simplified many difficult handling operations, with sharp reductions of accidents.

DESIGNED FOR SAFETY

The YARDLIFT "60" has all the sound and practical features so conclusively proved by the performance of the

YARDLIFT "40" and the YARDLIFT "20." Safety is of utmost importance in this field of handling; and the machine's two-wheel steering axle and dual-wheel drive axle with wheels widely spaced, provides maximum security. The pivoted steering axle mounting, a Clark development, enables the machine to carry its load evenly and safely while the tires follow smoothly the ups and downs of the ground surface. A special steering-gear ratio makes for easier operation; and the driver has a comfortable air-cushioned seat, easily adjustable and placed for good visibility.

That your business may enjoy these advantages, talk things over with a Clark field engineer, a man trained to survey your operations and to make unbiased recommendations as to the equipment that will serve you most economically. CONSULT CLARK.

CLARK ELECTRIC AND GAS POWERED FORK TRUCKS AND INDUSTRIAL TOWING TRACTORS



CLARK EQUIPMENT COMPANY, TRUSTRATOR DIVISION, BATTLE CREEK 51, MICH.
REPRESENTATIVES IN PRINCIPAL CITIES THROUGHOUT THE WORLD

which we make in this plant seldom demands high quantities and this type die would be considerably less expensive than the hardened steel dies now used.

H. J. DAILEY
Development Engineer

Westinghouse Electric Corp.
Bloomfield, N. J.

• More detailed information on use of the dies can be obtained from Ford Motor Co. Suggest you write Mr. Klemach, Ford Research Laboratories, Dearborn, Mich. Cerro De Pasco Copper Corp., 40 Wall St., New York, makers of the Cerro alloys, can also help you.—Ed.

FINANCIAL ANALYSIS

Sir:

I would appreciate receiving six additional copies of "The Iron Age Financial Analysis of the Steel Industry, 1947-1948" for distribution in our office.

G. R. JOHNSTON
Comptroller

Sharon Steel Corp.
Sharon, Pa.

CARBIDE CUTTERS

Sir:

I saw your book entitled "How to Use Carbide Cutters for Milling" at the ASTE Tool Show in Cleveland and would appreciate receiving a copy. I will be glad to pay any charges.

A. BOLDEN
Carbide Division

Union Twist Drill Co.
Athol, Mass.

• Copies of the book are \$1.10 each.—Ed.

WASHINGTON INTEREST

Sir:

It would be greatly appreciated if you could provide us with 5 copies of the "Washington" column, p. 104 to 106 of the April 8 issue. For your convenience we are enclosing a government frank to cover the cost of postage.

CAROL WANNER

National Security Resources Board
Washington

WRINKLE FINISH CONTROL

Sir:

The tearsheets on the article "Wrinkle Finishes—25 Control Points" from the Jan. 15 issue were greatly appreciated. Our engineers tell me this is the best article on wrinkle finishes they have ever read.

EDWARD H. CHRIST
President

Chemical Coatings Corp.
Rocky Hill, Conn.

IMPROVED PICKLING

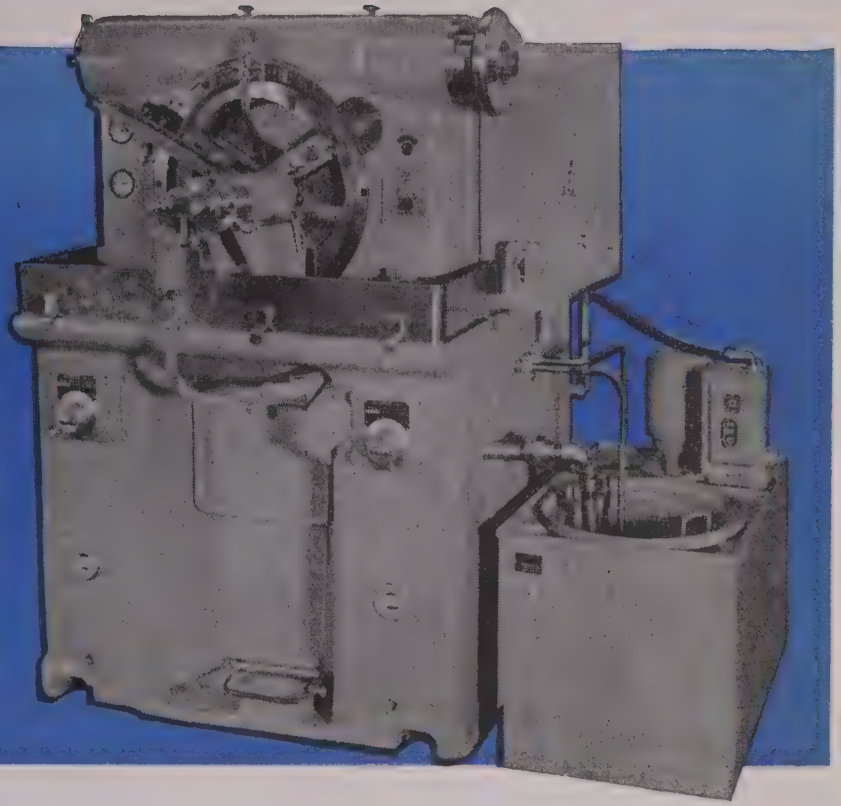
Sir:

In your issue of April 1, a News-front item states that pickling time

WANT CLOSE-FIT THREADS...FAST?

then you want

THE NAMCO
TRIPLE ROLL
HYDRAULIC
THREAD and FORM
ROLLING MACHINE
with
Magazine Feed
and
Hydraulic Loader



This new precision high-production machine is the perfect answer for shops that have a large volume of long and short thread work requiring to class 4 fit and unsurpassed finish.

Operating on the feed-through principle, with interchangeable two-roll or three-roll heads, the Namco Thread-Roller regularly produces smoother, more accurate work than ground threads. Capacities range from $\frac{3}{8}$ " up to $1\frac{1}{2}$ " using three rolls—and $\frac{1}{8}$ " to $\frac{9}{16}$ " using two rolls. Because of three-roll operation and three-point support which eliminates distortion, the machine is a "natural" for hollow work.

With the addition of magazine feed and hydraulic loader, just announced, the Namco Thread Roller becomes the fastest, most versatile, *most accurate* means for threading and form rolling, solid or hollow work to close tolerances with fine finish. Send us samples of the jobs you do; we'll do the rest—in quoting you on your requirements.



Complete details on the Namco Thread Roller are contained in this new eight-page bulletin. Ask us for TR 47.

The NATIONAL ACME CO.

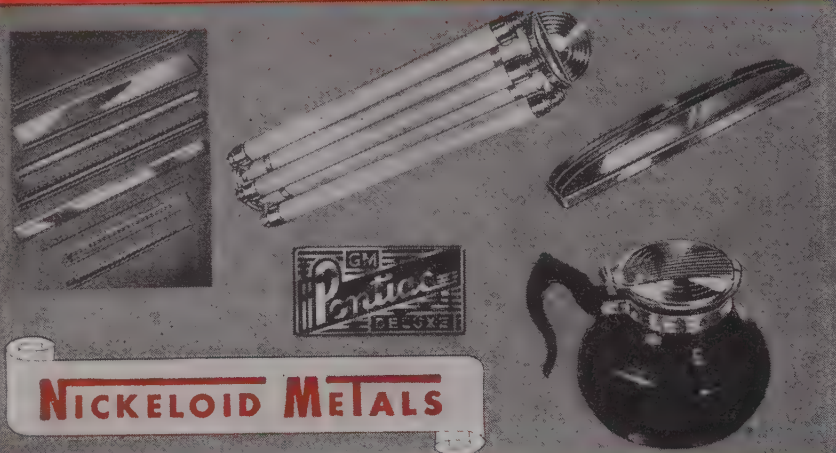
170 EAST 131st STREET • CLEVELAND 8, OHIO

Acme-Gridley Bar and Chucking Automatics:
1-4-6 and 8 Spindle • Hydraulic Thread
Rolling Machines • Automatic Threading Dies
and Taps • The Chronolog-Limit, Motor Starter
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Chrome and Nickel Plated Aluminum sheets are again available after a seven-year wartime absence. American Nickeloid Company *exclusively* offers these useful, durable metal sheets at an amazingly low price. The addition of the nickel or chromium coating makes the aluminum base more durable — mirror-like in finish. Chrome and Nickel Aluminum are rust-proof, highly resistant to corrosion, can be easily soldered, stamped, or formed. Available in sheets up to 36" x 96", bright or satin finish, wide range of gauges and tempers. Write today for more data.



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USES for NICKELOID METALS

This colorful illustrated booklet tells many of the ingenious ways in which manufacturers are using Nickeloid Metals to improve the appearance and marketability of their products. Write for it on your company letterhead.

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**AMERICAN
NICKELOID
COMPANY**

Established 1898

PERU 2, ILLINOIS

for hot rolled steel has been reduced. Acid and neutralizer conserved a fumes and gassing practically eliminated by addition of a synthetic detergent to pickling baths.

We would appreciate any further information on the synthetic detergent mentioned.

G. W. WEGNER
Works Metallurg

Columbia Steel Co.
Torrance, Calif.

• See "Detergent Additions Improve Pickling Bath Efficiency" in the April 29, 1948 issue, p. 77.—Ed.

GRAPHICAL METHODS

Sir:

We would appreciate 10 reprints of the article, "Graphic Correlation—Its Application to Steel Mill Problems," which appeared in the Nov. 6, 1947 issue.

H. A. SPADE
Research Laboratory

American Rolling Mill Co.
Middletown, Ohio

DIECASTING IRREGULARITIES

Sir:

The article "Causes of Diecasting Irregularities," published in the Nov. 13 and 27, 1947 issues were most interesting and comprehensive. I should very much appreciate a copy of the treatise for my files for future reference. Could you please send me one reprint?

RUSSELL B. EARLE
Chief Quality-Control Engineer
L. S. Brach Mfg. Corp.
Newark, N. J.

• We have sent tear sheets.—Ed.

PAINT REMOVERS

I would appreciate your sending me tear sheets of the article "Modern Paint Removers" by L. Kuentzel and A. W. Liger, appearing in the Oct. 9, 1947 issue.

J. J. WALLER
Montreal, Quebec

CARBIDE MILLING CUTTERS

Sir:

We would like to obtain one copy of "How to Use Carbide Cutters for Milling."

H. C. PRATT
Vermont Marble Co.
Proctor, Vt.

• The booklet is available to subscribers \$1.00 per copy.—Ed.

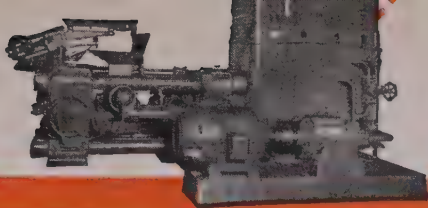
STEEL SHRINKAGE CURVE

Sir:

One of our clients has asked for the following information: "Where could a shrinkage curve for steel, using dry ice cooling, be obtained. To be used for press work."

We would appreciate your supplying us with any available data.

S IS THE



MACHINE THAT

MODERN INDUSTRIAL FIRMS USE TO TURN

SCRAP



METAL INTO A MORE

PROFITABLE BY-PRODUCT...

bulky scrap metal from machining
ling operations becomes a more
le by-product when compressed
compact briquettes with a Milwau-
draulic Press. Many large indus-
ants throughout the nation have
at this modern method of con-
metal pays in space saved, in
her percentage of materials re-
l, in lower melting costs.



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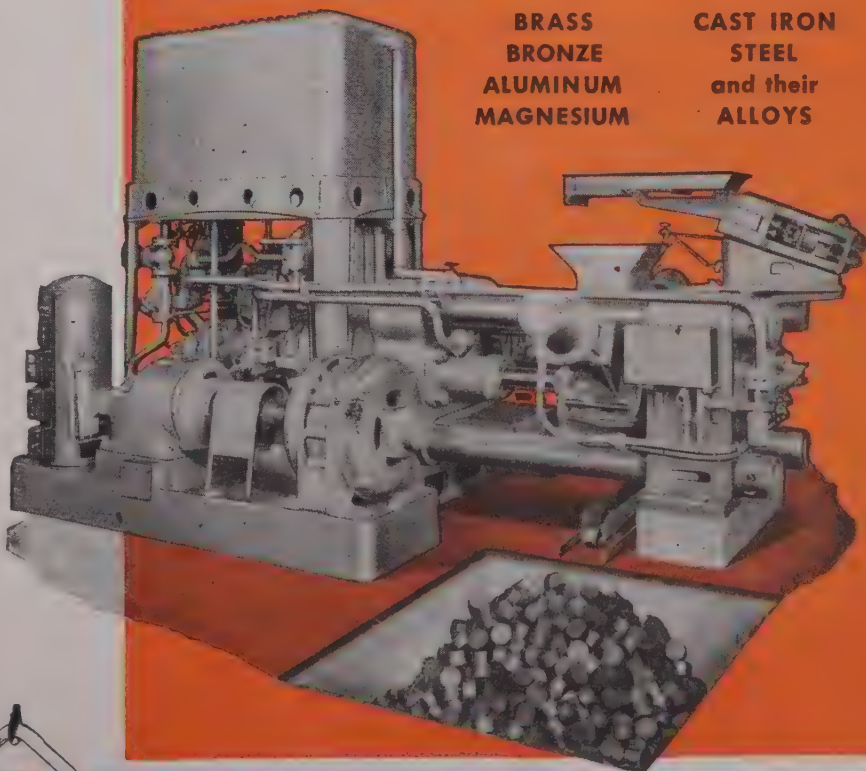
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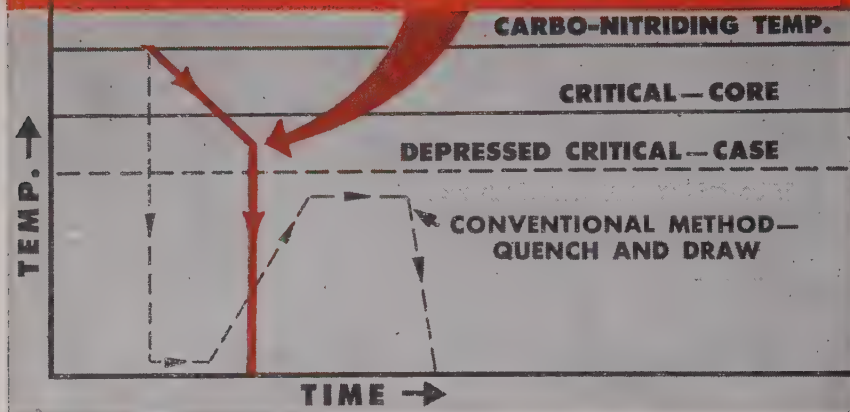
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this point or directing us to a possible source of information.

EDWARD S. JOHNSON, JR.
The Merrill Anderson Co.
New York

● Suggest contracting a subzero freezing equipment manufacturer, specifying the type steel involved, either the original or final piece size and the temperature range to be used. Ed.

INDUCTION HEATING

Sir:

We would appreciate receiving either a reprint or tear sheets of the article "A New Principle in Induction Heating," which appeared in the June 12, 1947 issue.

CURTIS R. PARDEE
Metallurgical Engineer

John Bath & Co.
Worcester, Mass.

PHOTO-PROJECTION METHOD

Sir:

We kindly request you to send us a copy of "Photo-Projection Inspection and Layout" by C. J. Kettle appearing in the July 31, 1947 issue. (A new simple and rapid method of inspecting and laying out intricate castings involves the accurate projecting of layout drawings on optical means into the surface of a casting.)

PAUL JULIEN

Periodieken-Import
Amsterdam, Holland

MAGNETIZED ALNICO

Sir:

An article appeared in the issue of Aug. 21, 1947, p. 87, in regard to a magnetic pulley made of Alnico. I am interested in learning where one may contact the production source of highly magnetic Alnico or where it might be purchased.

WALTER J. MADDRELL

Minneapolis

● Crucible Steel Co. of America, 405 Lexington Ave., New York.—Ed.

METAL SPINNING MACHINES

Sir:

I was interested in the article of "Metal Spinning" by R. J. Schneider in the Feb. 12 issue. Could you tell me who makes spinning machines for spinning steel sheets up to 6-in. diam and ask them to send me details, illustrations and price.

HOWARD J. THOMPSON
Managing Director

Thompson Bros. Ltd.
Bilston, Staffs, England

● We have asked several companies to send you the data requested.—Ed.

THOMAS L. KANE

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Capital Malnutrition

IN a previous editorial, we questioned the accuracy of current reported "record earnings." In the conventional calculus of profit, labor and raw material are charged at current rates. The fraction of structure and equipment which is consumed in the manufacture of each article is charged not at current prices but at the prices prevailing at the time of original acquisition. Thus, the same set of books which use last in - first out for inventory use first in - first out for plant.

On the arbitrary but not unreasonable assumption that the durable equipment of all manufacturing industries was acquired during the past 19 years, roughly in accordance with reported annual totals, these industries carry on their books consumable assets at a value of \$112 billion which could be replaced today for not less than \$187 billion. This means a charge of \$1 for the consumption of a capital item which must be replaced for \$1.67. In other words, industry is buying something for \$1.67 and selling it for \$1.00.

To be sure, established convention and the tax authorities require this kind of accounting. Yet the fact remains that the profits reported are fictitious. Worse still, the taxes paid have been levied on the basis of these phony profits.

Here is an actual case. A large oil company reported earnings before taxes of approximately \$16 per share. A careful appraisal of physical depreciation showed that permitted charges, on the basis of present replacement costs, were inadequate to the extent of \$5 a share. Earnings before taxes were actually \$11 instead of \$16. Federal taxes should have been \$4.18 instead of \$6.08. Net after taxes should have been \$6.82 per share instead of \$9.92.

The oil industry is fortunately in a phase of extraordinary prosperity. Yet many of our leading oil companies, in spite of huge apparent profits, have been unable to finance the necessary replacement of exhausted equipment and the expansion demanded by an insistent public appetite for their products out of earnings. In other less fortunately situated industries, the taxation of fictitious profits has actually amounted to a capital levy.

How serious is this?

During the 19-year period 1929-1947, the manufacturing industry reported net income of \$62.6 billion after taxes. The current reproduction cost of estimated existing capital facilities is \$75.4 billion greater than book cost. Inflation and accounting convention may compel manufacturers in the aggregate to short-change themselves by an amount that exceeds their total net income for the past generation.

This erosion of capital goes far beyond the deception of management and stockholders. It greatly aggravates the difficulty of raising adequate amounts of venture capital. It has already had an alarming effect on the capital equipment of America.

The president of the National Bureau of Economic Research has pointed out that the nation's capital during the half century from 1879 to 1929 increased from \$26 billion to \$70 billion each decade. During the 15 years from 1931 to 1945 there has been a net decline of \$9½ billion in non-war capital.

It is our magnificent tools, the physical embodiment of our capital, which account for the material progress and the high living standards of the American people. Through the attrition of taxation, hostile government and defective accounting procedure our capital substance is wasting away.

Joseph Stagg Lawrence



"KEY PEOPLE"—When You Need Steel

Ryerson's function is not only to supply your steel, but to deliver it on time. From the moment the Ryerson switch-board flashes your incoming call until the steel is laid down in your plant, a corps of helpful, intelligent employees well-trained in the Ryerson "Immediate Steel" tradition are at your service.

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In spite of shortages, we are putting forth every effort to serve all Industry to the best of our ability. Naturally, many sizes and certain products are out of stock. However, for the most part you can depend on Ryerson for immediate shipment of a wide range of steel products.

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RYERSON STEEL

► The brief life span of skimmers used in removing surface impurities from molten aluminum has been considerably lengthened. At least one aluminum producer has switched from a cast iron skimmer to a steel product with a new secret coating. Performance details are not disclosed but repeat orders indicate very satisfactory results.

► Scrap potential in Japan is close to 4 million tons. But red tape would prevent importing anywhere near that figure in the opinion of those who have been there and studied the matter. It is doubtful if more than 50 to 100 thousand tons could be obtained in Japan in the near future. People in foreign countries do not want to be paid in terms of their own money. They want food or clothing in return. Red tape prevents this being done, it may go on and on.

► Consideration is being given to the use of oxygen or oxygen-enriched air in high-speed gas heating. The higher flame temperatures thus produced, should, it is anticipated, materially improve heating rates now obtainable, which in turn would minimize distortion, decarburization and scale formation.

► As part of its current case against the steel industry, the Federal Trade Commission may succeed in having the American Iron & Steel Institute freight book outlawed. If it does, the smaller steel firms that don't maintain extensive traffic departments will probably buy a comparable service from one of the companies now supplying similar traffic data. Such data isn't yet compiled just like the Institute's--but it could be. It would just mean more expense to these steel companies.

► A recent survey by SAE among its members disclosed that out of the 27 companies who answered, 14 buy their alloy steel to the H bands. Five companies used other hardenability specifications, and eight companies reported they didn't believe in hardenability.

► The buyers' market in the rubber industry took an abrupt turn this week when several tire manufacturers went back from five to six-day production. Leading the demand is the new supercushion tire which has already won broad acceptance from auto engineers.

► The recently signed Dutch-Polish agreement provides for Dutch import of 18,500 tons of iron and steel from Poland by the end of this year. Chief items included are: 10,000 tons rails, 1500 tons plates over 10mm, 600 tons plates under 10mm, 1000 tons merchant bars, 500 tons structurals, 1500 tons cast iron pipe, 300 tons fittings, 500 tons nails, 600 tons forgings. Similar imports during 1947 totaled only 80 tons.

► Students of the steel capacity-demand picture might find it advisable in the future to subtract from total rated capacity a figure (it might be called the Lewis factor) to account for steel losses due to periodic coal strikes.

► The cement case is not the steel basing point case but there is a similarity. That is why steelmen are worried about interpretations on the cement decision. They feel that the present basing point method is the best under the circumstances, and that any ruling to the contrary would create disruptions in the distribution of steel which would prove fundamentally serious. They argue that FTC has not shown that its method would provide any better selling practice for steel.

► Foreign scrap possibilities are still news. An Eastern shipping firm is launching its own investigation of foreign scrap potentials, despite the meager results so far obtained by the numerous government and industry scrap missions.

Meanwhile 140,000 tons will be made available in Bizonia for export on order of the U. S. Military Government. Of this, 25,000 tons are to be sent to Italy for processing following an agreement with the U. S. Campsider Corp. Italian industry and government will look longingly at the passing metal.

► War talk, labor unrest and the indication that balancing of steel supply and demand can hardly occur during 1948 have combined to add thousands of new buyers to the lines waiting for new cars. Auto executives who had doubts a few months ago about the validity of their orders have stopped worrying about anything but building cars. Slightly used "new" cars are still selling at premiums of from \$500 to \$850.

► A lot of steel people would like to know what John L. Lewis is thinking. When the present contract runs out at the end of June, there will be a vacation. Some are predicting a mine shutdown if no agreement is reached by that time. They point out that "no contract no work" is seared in the minds of miners. Exhausted coal stocks make steel men fear even a short stoppage in the mines.

A Critical Survey of Investment Casting

INDUSTRIAL application of the investment casting process was introduced with an unprecedented amount of publicity during the war. It was accompanied by many exaggerations. Recent discussions have been more factual. To further clarify the value of this new casting system, the major producers who pioneered the developments upon which the industry is based cooperated with this survey analysis.

In the past 5 years some 100 reports on investment castings have been published. Few of these reports were of any value in developing an accurate understanding of investment potentials; still fewer had any value for design or management engineers. The loose claims of obtainable accuracies, metallurgical qualities and economies which could be affected by adoption of the process developed serious misconceptions. Investment castings became incorrectly to be considered competitive on a price basis with automatic machining methods or automatic casting methods.

The facts are to the contrary. Investment castings are expensive when considered on the basis of piece price from the foundry. It is true that, properly applied, investment castings can result in remarkable economies. Usually these economies occur when the production of small complex parts, which are difficult to machine to required tolerances or which are impossible to machine in the proper alloy, is changed to the investment process.

A "precision" casting is in a different realm of accuracy from a precision machined part. Most production engineers think, when the word "precision" strikes their eyes or ears, of tolerances in the range of 0.0001. Foolish claims made by inexperienced persons tended to confirm the impression that such tolerances were actually possible in the investment process. On a laboratory scale anything is possible but on an industrial scale practicability is of prime importance.

The investment process is another metals founding method. All operations involving the

conversion of liquid metals to solids are inaccurate, by their nature, when compared to the conversion of solids of one shape into solids of another shape by ordinary machine techniques. In addition, the investment method has variables which are peculiar to it. All contribute to the difficulty of obtaining exact dimensional control. When informed of this, designers too often feel they have been misled and cheated and are inclined to drop the idea entirely.

"Precision" castings can be formed by four different methods which are more accurate than sand casting techniques or other hot metal transformations: pressure die castings, permanent mold castings, plaster mold castings and the investment castings. Each has a particular range of applicability. Each can produce specific shapes and sizes in certain alloys more precisely than the others.

Of these precision casting systems, investment molding is the most flexible. In the complexity of shapes, closeness of tolerances and variety of metals which can be handled, investment molding is most applicable. Investment molding permits casting all commercial alloys which can be liquified in available melting equipment, except the Alnico metals, within the size range which limits the process.

To clarify engineering thinking, it seems advisable to drop "precision" from the investment casting process title. The practical limitations of the lost-wax process forms the balance of this report. An investment casting is a precision part when compared with tolerances characteristic of other hot metal forming methods. It is not in the range of accuracy claimed by many during the war, nor is it capable of producing the results obtainable by machining, in most alloys.

Investment casting tolerances are specified in thousandths of an inch per inch. Increasing the size of the casting causes the investment system to lose the competitive advantage based on the dimensional control aspect, at least in so far as

In an effort to overcome some of the misconceptions held by many design engineers and other industrial executives concerning the limitations and advantages of the investment casting process, the industry has cooperated in the preparation of this survey. It presents, in concise form, information and data necessary to intelligently appraise the potentialities of investment casting as a means of reducing costs or improving performance.

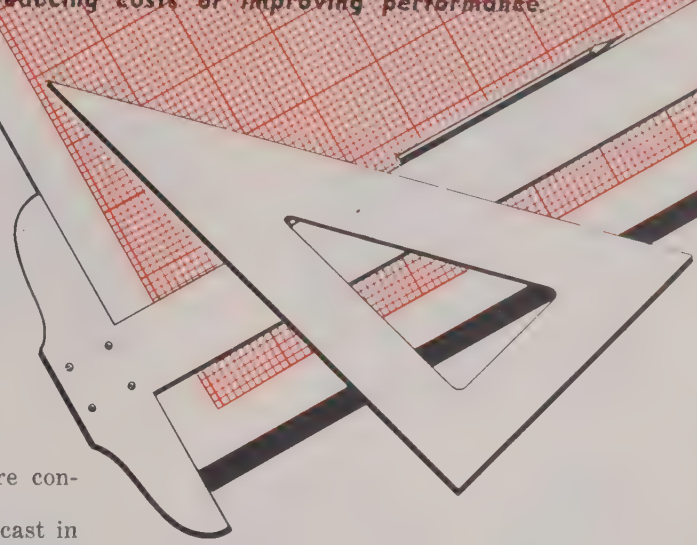
By RAWSON L. WOOD

President, Arwood Precision Casting Corp.,

And

DAVIDLEE VON LUDWIG

*Consulting Material Engineer,
Brooklyn*



the dimensions on the larger sections are concerned.

To illustrate, assume a steel part to be cast in investment has a 10 in. dimension. The foundry tolerance is ± 0.005 in. per in. Total possible error in 10 in. is then ± 0.050 in., slightly better than a good sand casting. In practice, even for such dimensions, if design is correct, much closer tolerances can be held. Generally speaking, investment castings with dimensions longer than 4 or 5 in. are dimensionally the same for these sections as might be obtained in other castings, when considering alloys which have alternate founding methods.

Although it is usually uneconomical to use the investment process for casting large parts in alloys which can be readily machined, exceptions do exist. For example, bronze impeller wheels are advantageously cast in investment because of the resulting smoothness of the fine pumping passages. Not only does this eliminate tedious hand grinding of passages difficult of access, but the efficiency and life of the pumps are improved. Usually the field of investment castings is to be found in the production of castings in hard alloys or small castings of such complexity as to be uneconomic to machine. The hard alloys melt at such high temperatures that they cannot be suitably cast or forged.

Sizes which can be cast in investment are limited chiefly by the capacity of existing foundry equipment. The minimum size of an investment casting has not been reached. Steel castings weighing 500 to a pound are common. Aluminum in the same size range would run 1500 and magnesium 2000 to the pound. At present the largest investment casting in production weighs 12 lb. It is a turbine stator complete with blades of 8½-in. diam. The rotor for the turbine is 7½-in. diam and weighs 8 lb. No effort is made to control overall dimensions to close tolerances on these gravity poured castings. The blade contours are held without subsequent machining being required and the spacing between blades is criti-

cally maintained at a total variation of 0.003 in. All accessible faces have approximately 0.075 in stock for turning or grinding.

The economic advantage of the investment process, even when only a few dimensions are maintained, is evidenced by the prices for these parts. The stator formerly cost nearly \$800 to hog from a forged blank. The rotor cost approximately \$250. The cast parts, finish machined, cost only \$30 and \$25 respectively. The strength of the casting and freedom from directional grain orientation increased the rotor strength 50 pct. Another example is the radar illustrated in fig. 1. This part formerly cost more than \$350 to machine from stock and assemble. The investment casting, finished, costs \$75, of which \$27.50 is the casting price.

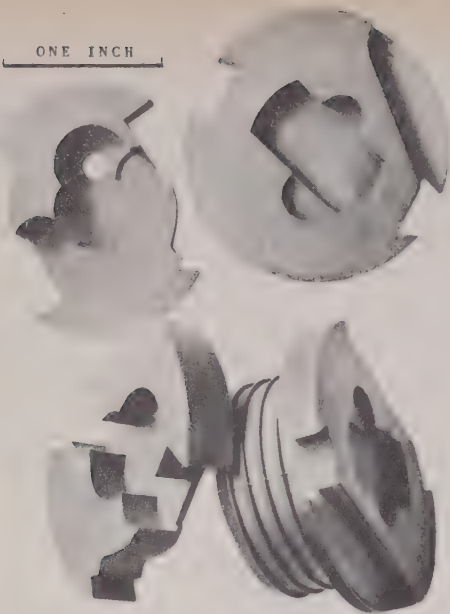
It is not always possible nor important to achieve a 10:1 price reduction when applying investment castings in place of alternate production methods. Investment castings are frequently used when the dollar price is higher, rather than lower, in order to take advantage of design possibilities and materials not otherwise obtainable. In considering a change to an investment casting, the total picture, economic and engineering, must be considered. It is desirable to reduce costs when possible, but extended life, freedom from service failures and product reputation usually are far more significant.

Maximum production dimensions must be confined to the flasks and furnaces available. The largest cylindrical mold is of 10 in. diam and 20 in. long. The largest box flask is 9x12x15 in. There is no known weight limit which can be gravity poured into these sizes. Pressure castings are generally restricted by the melting capacity of the pressure pouring furnaces to about

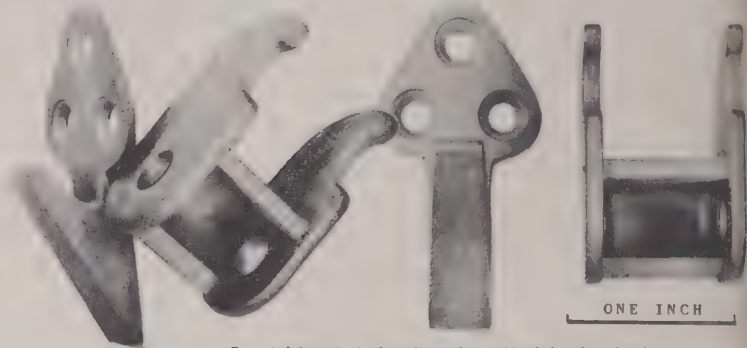
Investment Cast

FIG. 1 - Some interesting examples of the effective utilization of investment casting techniques are presented on these pages. Cast in ferrous and nonferrous alloys of various types, these parts illustrate many difficult design problems which were successfully overcome by investment casting. Pertinent data concerning exact part are given in the caption.

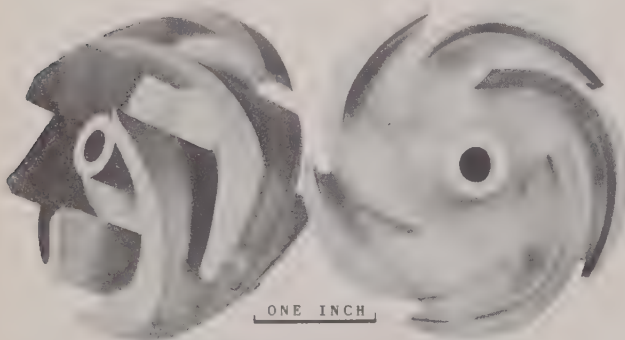
ONE INCH



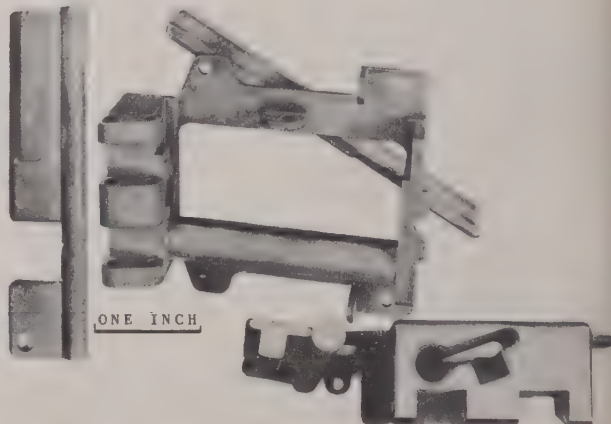
● This indexing cam set for business machine was difficult to produce due to interrelating curves, angles and problem of location. Cast in beryllium copper.



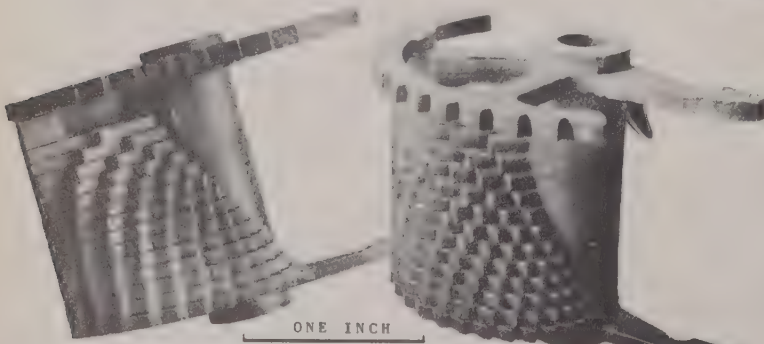
● Two stainless steel aircraft castings. Hook for door latch is 18-8; limit stop for berthable chair is 410. Both difficult to machine.



● Aircraft fuel pump impeller cast of 356T6 alloy. Broached spline in center completes part.



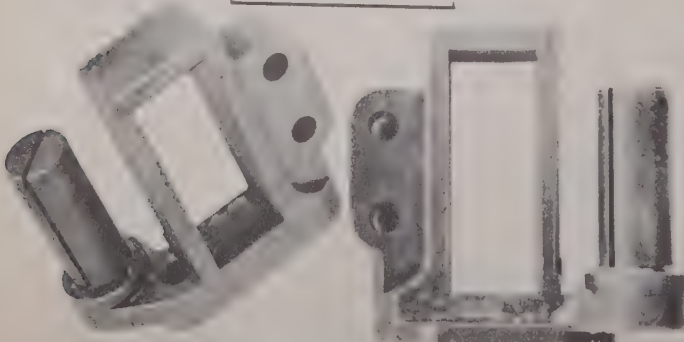
● Key and section for watchman's box cast in silicon brass. Holes used as cast. Keyway untouched except for reaming round hole for key stem. Over 30 machine operations eliminated.



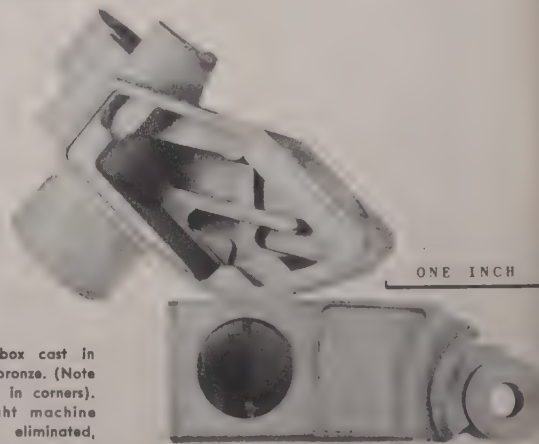
● Variable calculating cam cast beryllium copper. Formerly assembled and pinned for multiple stampings, less accurately. Cost nearly \$30 per piece. Castings cost approximately 1/10th.

ONE INCH

ONE INCH



● Brush box cast in phosphor bronze. (Note investment in corners). Thirty-eight machine operations eliminated, broaching, slotting, brazing, drilling, milling, tapping, etc. Casting price, 60¢.

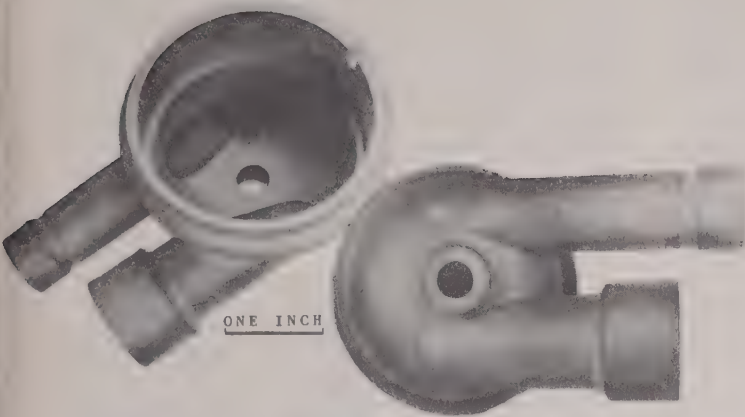


● Binocular prism holder. Total weight 4 1/2 oz. Magnesium castings with wall thickness of 0.030 in. Porosity not permissible; no draft allowed.

ONE INCH

Parts in Various Alloys . . . *Photos courtesy Arwood Precision Casting Corp., Brooklyn.*

ONE INCH



● Magneto cover cast manganese bronze for aircraft. Inspection is 100 pct x-ray. Freedom from porosity required. Diecasting not dense enough, sand castings too heavy and porous when machined.

ONE INCH



● Two small steel parts for aircraft, difficult to machine. The cam yoke for gyro horizon is 410 stainless. Latch nose in 4130 steel is gear down lock for landing wheels.

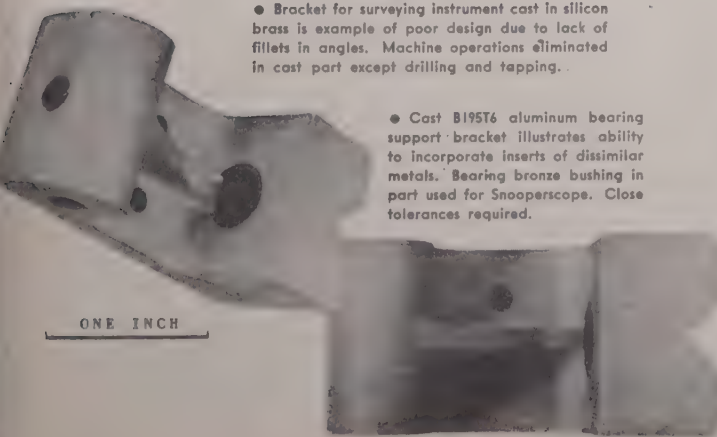
ONE INCH



● Bracket for surveying instrument cast in silicon brass is example of poor design due to lack of fillets in angles. Machine operations eliminated in cast part except drilling and tapping.

● Cast B195T6 aluminum bearing support bracket illustrates ability to incorporate inserts of dissimilar metals. Bearing bronze bushing in part used for Snooperscope. Close tolerances required.

ONE INCH



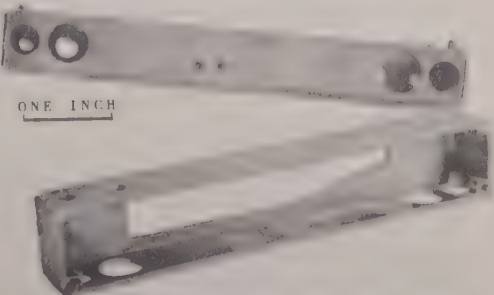
● Two bronze castings represent different problems. Round piece in phosphor bronze is cam drum formerly containing 12 pieces, stamped and pinned. Total cast error 0.005 in. —steps held to 0.002 in. and angular spacing to 1/2. Postage meter stamp in silicon brass; eliminates engraving letters and 20 operations.

ONE INCH



● Automatic closure (zipper) casting in silicon brass represents difficult part to cast without warpage due to ratio of length of thickness, plus center difference in thickness.

ONE INCH



● Housing for camera part in silicon brass. Difficult to cast due to warpage. Holes held concentric across walls within 0.002 in.—pins held 0.004 in. lengthwise.

5 lb. The process should not be expected to yield accurate dimensions on large castings except for definite control sections, such as the blades on the turbine parts previously discussed.

Within the size limits outlined, designers have complete freedom of shape and alloy selection. To assist in understanding the types of parts now being produced, a number of such parts are shown in fig 1. No effort has been made in these photographs to retouch common casting defects which might appear on industrially produced castings. Many of the defects visible can be removed at the foundry, when required, before shipment, but others usually remain and must be considered by the designer in selecting the process for a given piece.

In order that designers and other executives understand more fully the potentials of investment casting, a discussion of the several production techniques and their effects on the accuracy of the cast parts follows. Space limitations prohibit an extended discussion, but the broad details of each technique are covered.

Master Patterns and Production Dies

The first step in producing a good investment casting lies in a correct blueprint. Frequently parts which have been designed for other forming methods are transposed to investment without modification. Invariably, improved performance and reduction in price can be obtained if blueprints are reconsidered in the light of the new technique being used. Cooperation between engineer and foundry is most important, particularly for production of the first investment casting used by the customer. The designer will discover the results which can be obtained more than meet his needs if he works closely with the foundry and makes his needs known at the proper level.

The first foundry step is either the production of a steel die or a master pattern. Masters can occasionally be made from old sand castings when sufficient stock is available to allow for all dimensions plus shrinkage. This saves time and money. Steel dies are more costly, but wear indefinitely and are necessary for more complex parts requiring the maximum cast size control.

The fact that master patterns normally are held to tolerances a third those of the final casting indicates that the more rigid the tolerances the more expensive the master, or the die, will be. Where possible tolerances should be as liberal as possible to reduce the difficulty of die forming or master pattern production, as well as to reduce the cost of the castings. The completed master, when used, becomes the source of all soft metal dies until the part is redesigned. It serves as the means of checking die cavities against wear. A good master is essential for control of accuracy throughout production of castings from soft metal dies.

Dies are formed by several methods. Steel dies are preferred for long runs, but it is difficult to machine multiple cavities in steel which are exactly alike. Therefore steel dies are limited in preference to those firms most experienced in producing them.

Soft metal dies are suitable for short runs of waxes and fairly simple shapes. White metal

alloys of tin, lead and bismuth are used. The dies are formed by casting the low melting metals around alternate halves of the master pattern under moderate air pressure. These die halves are cleaned and usually backed with steel or aluminum to strengthen and protect them. Sometimes dies are sunk into aluminum or magnesium alloys, because of their superior machining characteristics, for relatively short runs of complex shapes not suited to the white metal mold system. Obviously the initial accuracy of the wax injection die is very important. The stability of the die material, its resistance to warpage and wear and its freedom from metallurgical changes which might affect its accuracy are all contributory to casting quality.

Wax Composition and Handling Methods

Each foundry has its own preferences in wax compositions. There are more formulae than there are investment firms. Some use four or five different mixes dyed to distinguish them for particular purposes. The mixes vary in ability to render very fine detail, in freedom from thermal warpage, in hardness at room temperature, in brittleness and ease of removal from the dies.

Physical properties of the wax have most control over the accuracy possible in a given piece. Tendency of the wax to warp during handling is a major source of error. Long thin waxes are particularly difficult to control. Poor casting design shows up first in the difficulty encountered in molding the waxes. Heavy sections difficult to feed are prone to shrinkage in the wax as well as in the metal form. Waxes which warp because of the existence of dissimilar sections and attendant stresses indicate metal parts which will have the same proclivity. Waxes which break easily in sharp un-filleted corners indicate the tendency which will be inherent in the casting. It is doubly important to obey all design rules for good casting quality when using the investment process.

To minimize manual handling several firms incorporate the gate for the casting in the die, whenever possible. The gate may then serve to admit wax to the die and metal to the mold cavity. The freedom with which the wax fills the die from such a gate acts as a guide to the way the metal will enter the mold. One firm is using a modified diecasting machine to produce large quantities of wax patterns of simple shapes. This also eliminates manual handling in extracting the waxes from the die.

Wax stability is important. Its ability to resist deformation due to ambient temperature changes must be known. The degree of wax expansion before losing its cold strength is a measure of the force which will tend to distort the mold cavities when heating the mold to melt out the patterns. In computing master patterns and dies the wax characteristics must be integrated with the expansion factors of the investment and the shrinkage rate of the alloy to be cast. It is essential to stabilize the thermal response of the pattern wax.

Alternate materials have been tried for patterns. Polystyrene plastics offer many mechanical advantages but have been used only to a limited extent. They are not fully satisfactory

as they tend to leave undesirable residues in the mold after firing. No foundry is equipped with plastic injection machines.

Frozen mercury is reported being employed by one firm for patterns. Its main advantage is the freedom from warpage of investment due to the fact that the mercury contracts as it changes from solid to liquid. Obvious handling difficulties limit its application but if the tolerances being claimed for the mercury patterns are practical for production operations the future use of mercury patterns for the most exacting work is probable.

Investment Mixes and Molding Methods

Two types of investment material are used by

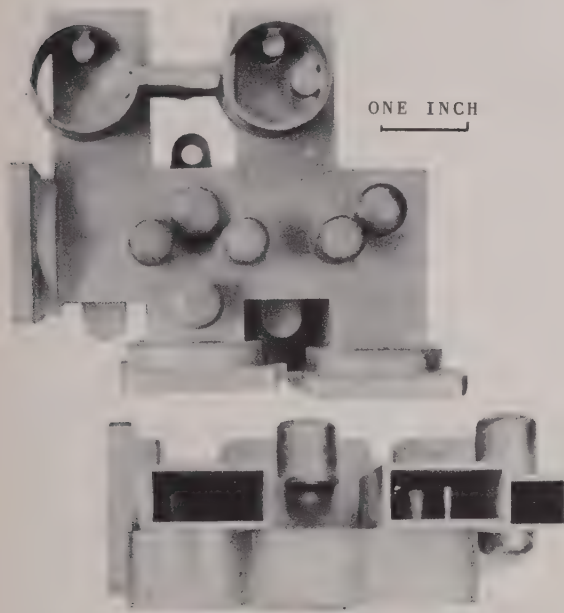


FIG. 2 - An example of the potentialities of intelligent application of investment castings. The part is a radar wave guide mixer body cast in B195 aluminum. Part cost \$350 when fabricated; casting cost is \$75. Production rate as investment casting is 2 per hr. Interior rectangular passages held within 0.002 in. parallel and from center to center.

the lost-wax foundries. High temperature castings usually are made in molds with silica as the base. Binding is done with ethyl silicate or a water suspension of colloidal silicate. Low temperature metals, and the low carbon-low alloy steels are cast in investments which consist of various proportions of silica, asbestos, cristobalite and gypsum. All castable metals can be poured in these investments. Due to the differences in investment chemistry used, the different foundries tend to specialize on either high temperature alloys of steel and the nonferrous alloys based on cobalt, nickel and chromium, or on the low temperature nonferrous alloys of aluminum, copper and magnesium bases plus the low carbon and low alloy steels. The magnesium alloys cannot be handled in the straight silica molds but are produced in gypsum bonded mixes. Surface finish and dimensional tolerances are not as good in the high temperature materials as in the lower

temperature alloys. Investments which can handle the high chromium alloys frequently are unsuitable for low carbon steel, and contrariwise, high chromium steels sometimes are attacked by the investment suited to low carbon and unalloyed iron base metals.

A surface defect which is more prevalent in the silicate bonded investments than in those bonded with gypsum is the presence of excess metal globules, especially in the roots of threads and serrations. To obtain a smooth surface in silica molds the waxes are dipped in a pre-coating mixture which usually consists of silica flour in ethyl silicate or colloidal silicate in water. This precoat contains many fine air bubbles. The coating is permitted to age and harden before being backed with the remainder of the investment. After the flask has been filled with investment it is vibrated to remove air. However, as the precoat has hardened considerably before vibration begins, the fine air cells cannot be excluded. Each small air bubble which locates on the wax interface becomes a small globular projection of surplus metal on the casting. It is not generally realized that the smooth surface expected of investment castings is the result of hand grinding and filing in the foundry as much as the result of investment used.

Gypsum bonded investments and other fine grained mixes which are used without the intermediate precoat produce castings which are freer of globules and other irregularities. Under-sides of waxes still trap small air bubbles during vibration of the investment mix, even though the invested waxes are vibrated immediately after the liquid mixture is poured into the flask. Interior cavities usually retain small bubbles which form globules during casting. These defects do not effect the strength of the castings because they are surplus metal and when removed leave no mark, but when they occur in sharp corners, threads and serrations, their removal becomes a problem.

A promising investment not in general use is based on kaolin or porcelain clays. Believed to be the material used in the mercury casting process, it produces good finish and close tolerances. The physical nature of porcelain is ideal for use in casting hot metal. The molds can be made as thin shells merely by dipping the patterns into a slurry for proper consistency, aging to pre-harden the coat, and then firing the mold to remove the patterns and to convert the clay into a hard ceramic. These molds are fragile, they ring with a bell-like tone when tapped, but have high static strength and are able to stand very high thermal shocks without failure. The absence of a bulky backup investment minimizes the insulating tendency of the porcelain so that rapid solidification of castings is obtained. Shell molds are easily removed by shock quenching or vibration. The ability to pour such molds at temperatures nearly equal to the molten metal would result in production of exceptional detail without loss of metallurgical properties.

Melting and Pouring Techniques

Several melting methods are employed. The first furnace of industrial value used carbon arcs to melt the metal. To protect the metal against

oxidation these furnaces were built carefully to prevent admission of air. Reducing conditions usually are obtained. Metal is poured from these furnaces by clamping the hot mold to the top of the furnace over a pouring hole and inverting the assembly. Air pressure is automatically applied when the metal has filled the mold to help fill out the sharp contours of the casting. For the higher temperature alloys and for small charges (up to 15 lb) these furnaces are widely used.

Induction heated crucibles are becoming widely popular to melt larger charges of metal for ladle pouring in gravity, suction or centrifugally fed molds. Low melting alloys are commonly melted in gas fired crucibles as well as in induction furnaces. Crucible methods do not directly refine the melts by reduction of oxides, but adequate chemical methods are used to produce metal of high quality.

New developments are being investigated to provide ways of economically melting by induction under controlled atmospheres. The probable outcome will be the use of large circular molds in which the melt is held in a central cavity while being melted and then transferred to casting cavities circumferentially placed by centrifuging. With such an arrangement, melting in a closed shell by induction would permit use of reducing, inert, oxidizing or special atmospheres under pressure, or would allow melting and casting in a vacuum when required.

In addition to the inversion pouring method and normal ladle pouring into gravity fed molds, two vacuum or suction pouring systems are in use. The most common way is to provide a vacuum pressure of 29 in. Hg, (about 14 psi air

pressure by inversion), which is applied on the bottom of the flask. This draws air through the investment out of the casting cavities in advance of the molten metal being poured into a sprue from the top. The other vacuum system inverts the mold and draws the air out of the bottom of the mold upwardly, sucking the metal up into the casting cavities as the air is exhausted from the mold. This does not work too well because of the tendency to first draw oxides up from the metal surface into the casting zones. None of the pressure or vacuum methods have any beneficial effect upon the melt, other than tending to minimize, by compression, trapped air, or avoiding trapped air by exhaustion.

The most promising method for metallurgical refinement is by centrifuging the liquid metal as it is being cast. This was the most common casting method employed by dental and jewelry firms and many authorities concur in the belief that centrifugal casting is the simplest way to separate dissimilar materials from the melts. Centrifuging preferentially excludes gases, oxides and other drosses, thus forming more solid castings. When correctly gated, centrifugally cast parts are more solid and closer to dimension than when produced otherwise. The process of melting in the integral melting cavity in large circular molds, under controlled atmosphere conditions, holds promise not only for improving metallurgical quality but for reducing casting cost.

In the concluding part of this article, to be published in the next issue, the author discusses factors affecting the choice of alloys for investment casting; the types of metals being successfully cast, and lists numerous applications. A check list of what every design engineer should know about investment casting is also given.—Ed.

Continuous Noncontact Gaging of Hot Strip

CONTINUOUS non-contact hot steel strip gaging by means of an X-ray thickness gage is being accomplished at the Irvin Works of Carnegie Illinois Steel Corp. This instrument, which is being used to measure strip as hot as 1400°F as it leaves the finishing stand, was described at a recent meeting of the American Institute of Electrical Engineers by C. W. Clapp and R. V. Pohl, both of General Electric Co., Schenectady.

The operating principle of the gage depends on ports enclosing an X-ray tube to select two beams, directing one through a standard wedge and the other through both a measuring wedge and the strip to be gaged. Detectors behind the materials pick up the unabsorbed radiation which is, of course, a function of the thickness of the intervening material. When a detector finds the intensity in the measuring beam is different from the standard reference, a motor control shifts the measuring wedge so as to equalize the radiation striking the two detectors. The positions of the two wedges, the standard and measuring, are then transmitted through separate selsyn systems to two scale pointers one of which, being connected to the standard wedge, will indicate the nominal steel thickness to which the gage is set, while the other, connected to the measuring wedge, will indicate on a zero center scale the

deviation in sample thickness from the nominal gage size.

The General Electric gage has a clear opening 18 in. high so that normal fluttering and vertical vibrations are not harmful. The equipment is encased so that cooling water spraying on the strip cannot cause shorts or harm the instrument. High voltage components are contained in a lead lined oil bath with forced circulation and water cooling of the oil. The remainder of the equipment exposed to heat is mounted in a water cooled steel housing.

Correcting the gage for temperature depends only on the coefficient of expansion of the steel and amounts to about 1.6 pct per 1000°F for

Use of an X-Ray gage for the continuous gaging of cold rolled strip was discussed in THE IRON AGE, Jan. 29, 1948, p. 69.—Ed.

ordinary carbon grades. Rolling temperature need only be known to $\pm 200^\circ\text{F}$ in order to graduate the scales for adequate correction of this error.

X-ray radiation from the unit is said to be below harmful levels to personnel except in the measuring beam itself, and access to this small area can be easily blocked off when the X-ray tube is emitting.

Metal Powder Meeting—

. . . Fourth annual MPA meeting attracts powder producers and parts fabricators to Chicago.

. . . Importance of controlled atmospheres in sintering stressed.

. . . Prospects for ceramals by powder metallurgy explored.

WITH some 190 representatives of metal powder producers and parts fabricators in attendance, the Metal Powder Assn. held its fourth annual spring meeting, April 15 and 16, at the Drake Hotel, Chicago. In addition to the two-day technical session, during which various quality and production problems were discussed, the exhibits of 15 metal powder producers, parts fabricators and equipment manufacturers were on display.

Considerable interest was expressed by those at the meeting in two papers dealing with the ramifications of controlled atmospheres for sintering. A review of these presentations is included in this report, as is an abstract of a paper surveying the possibilities of powder metallurgy in the manufacture of components for use at elevated temperatures.

The present officers of the Metal Powder Assn. are as follows: president, H. E. Hall, president, Metals Disintegrating Co., Elizabeth, N. J.; vice-president, S. K. Wellman, president, S. K. Wellman Co., Cleveland; chairman of the board of directors, T. L. Robinson, S. K. Wellman Co.; and acting secretary and treasurer, R. L. Ziegfeld, secretary and treasurer, Lead Industries Assn., New York.

The application of the proper protective atmosphere in the sintering of metal powders was covered by Norbert K. Koebel, director of research, Lindberg Engineering Co., Chicago, in his presentation entitled "Sintering Atmospheres Used in Powder Metallurgy." He pointed out that since powders will not sinter properly if oxides or other surface films are present, the function of the protective atmosphere is to prevent oxidation at the sintering temperature and also to reduce any oxides that might be present on the powders when they are pressed.

Inert atmospheres and vacuum do not meet both of the above requirements and, therefore, are not used commercially on the sintering of powders, the speaker indicated, whereas reducing atmospheres are always used. A reducing atmosphere is one that will reduce the oxide of the powder to the metallic form when heated to an elevated temperature in the presence of the reducing atmosphere. A reducing atmosphere that is reducing to one type of metal may not be reducing to another type, and therefore the proper reducing atmosphere must be selected for the metal powder or powders to be sintered.

The choice of the reducing atmosphere is dependent upon the material to be sintered, the initial cost of the atmosphere generator, and the



operating cost of the generator. The various types of reducing atmospheres used commercially are listed in table I. This table also shows what one can expect to pay for a generator of 1000 cu ft per hr capacity (an average size) and the cost of producing the gas on the basis of 1000 cu ft per hr.

Inasmuch as the controlled-atmosphere factor is very important in the sintering of brass powders, H. C. Miller, vice-president, Charles Hardy, Inc., New York, discussed this aspect at length in his paper "Sintering of Brass Compacts."

In the study described by the speaker, 70-30 brass compacts, which had been pressed at 30 tons per sq in. with a die lubricant, were sintered in atmospheres of a mixture of pure dry hydrogen and nitrogen ranging from 100 pct nitrogen through 100 pct hydrogen. A flow of 2 liters per min was used over a sample weight of 100 g of brass.

The author pointed out that there are several possibilities for preventing zinc loss (dezincification); (1) increasing the pressure of the sintering atmosphere to such an extent that zinc vaporization is prevented, (2) saturating the sintering atmosphere with zinc vapor, and (3) confining the parts to be sintered so that a minimum of dezincification will saturate the surrounding atmosphere, which necessarily must be static during sintering.

To saturate normal sintering atmospheres by increasing the pressure of those atmospheres does not seem feasible within the range of convenient operating pressures. In the laboratory, pressures of as great as 10 psi gage have failed to show any significant alteration in the zinc losses using a fully dissociated ammonia atmosphere with a flow of 2 liters per min. The density of this and similar common gases is such as to require considerably greater pressures before a noticeable effect is obtained.

The use of zinc vapor in the atmosphere has received considerable attention as a means of reducing dezincification. The zinc is usually placed in the furnace with the parts to be treated either as zinc metal or as turnings of the same composition as the alloy being treated. One of the major difficulties of this approach, as tested in the author's laboratories, has been to attain saturation when the atmospheric vapor is produced at or near the same temperature as the sintering parts. Complete saturation appears an essential to prevent dezincification while a distortion of the equilibrium in the other direction leads to condensation of the zinc vapor on the sintering parts and thence to fusion of surface areas.

Permitting the initial dezincification of the parts to saturate a static atmosphere, while not the true solution to the problem, appears to have considerable promise as a means of controlling, if not limiting, zinc loss. Under such conditions it would be necessary either to preheat the parts at a low temperature, or to purge the muffle during heatup in order to expel volatile lubricants. It would also be essential that the gas not be required to react with the parts in any way, as for example, in reduction, since the reaction products would remain during sintering. Since a reducing action appears desirable, this may be performed as part of the preheat cycle, using the lowest temperature which permits adequate reduction.

The atmosphere for sintering should be a reducing gas. From the point of view of zinc loss, the gas should be low in carbon monoxide, water vapor and hydrogen, although the physical properties of brass powder compacts are improved by the presence of hydrogen in concentrations of 60 pct or more. Dissociated ammonia is very effective as an atmosphere.

The most interesting and probably most important development of ceramals is in the field

TABLE I
Relative Cost of Sintering Atmospheres

TYPE	Initial Cost of Equipment to Produce 1000 C.F.H. Gas	Cost of Prepared Atmosphere Per 1000 C.F.H.	USES
Cylinder Hydrogen		\$10.00	All purpose sintering atmosphere. Must be used for Alnico, Stainless steels or alloys in excess of 2% chromium.
Cracked Anhydrous Ammonia 75% H ₂ —25% N ₂ with traces NH ₃ Dew Point —60°F.	\$4000	\$1.00-\$4.50	Used in place of cylinder Hydrogen to reduce cost.
Completely purified with activated alumina to remove traces NH ₃ .	\$5500	\$1.05-\$4.55	
Exothermically Cracked Gas 80°F. Dew Point.	\$1800	\$0.06-\$0.15	Most wide spread in use. Used for copper, copper-tin, nickel, and low carbon iron powders. Refrigerated or dried to low dew point to prevent discoloration on iron. Not necessary for copper alloys.
Above Refrigerated to 40°F Dew P.	\$3000	\$0.07-\$0.16	
Above Dried to —60°F. Dew Point 15% max H ₂ , 10% max CO, 4% min CO ₂ 1-2% CH ₄ Bal N ₂ .	\$3300	\$0.07-\$0.16	
Exothermically Cracked Gas with Endothermic Charcoal.	\$4000-\$4500	\$0.20-\$0.30	Used for medium and high carbon iron powders to prevent decarburization.
Purification to Remove CO ₂ and H ₂ O 20-40% H ₂ , 20-25% CO, Bal N ₂ —10°F. Dew Point.	\$8000-\$10,000	\$0.25-\$0.30	Used for medium and high carbon iron powders to prevent decarburization.
Exothermically Cracked Gas with Chemical Purification to Remove CO ₂ and H ₂ O. 15% H ₂ , 10% CO, 1% CH ₄ , Bal N ₂ , —60°F. Dew Point.			
Endothermically Cracked Gas 38-40% H ₂ , 19-21% CO, 0-0.5% CO ₂ 0.5-2.0% CH ₄ , Bal N ₂ , 0°F min Dew Point.	\$4000-\$4500	\$0.20-\$0.30	Used to obtain more powerful reducing atmosphere than produced exothermically. Used for low medium and high carbon iron powders.

of high-temperature resisting materials. H. H. Hausner, adjunct professor and research associate, New York University, and section head, Sylvania Electric Products, Inc., Bayside, N. Y., explored the application of powder metal techniques to this study of metal-ceramic products in his paper "Metal-Ceramics, A New Field in Powder Metallurgy."

With the exception of titanium, the melting points of the metals are much lower than those of the respective oxides, whereas the melting temperatures of the silicates are generally between those of the metals and oxides. The reactions, occurring between metals and oxides or silicates, are subjects of most of the research work done in this field at the present time. Metals are generally characterized by a certain ductility and mechanical strength; they withstand temperature shocks, but they corrode at higher temperature, thereby losing their strength. Ceramic materials are poor in tensile strength (although some of them are very high in compressive strength); but they withstand high temperatures without any corrosion. Mixing both—metal powders and ceramic raw materials—compacting and heat treating them is considered to be a method to combine the high strength of the metals with the non-corrosive quality of the ceramic products.

Tungsten-copper-nickel compositions and similar compositions are known for their extremely high densities (17.4 g per cc) and for their machinability which is caused by a specific grain structure. The formation of a tungsten-nickel-copper phase and of the growth of round tungsten particles is characteristic for heavy metal. The hardness of heavy metal is in the range of 60 to 70 RA, but decreases rapidly at elevated temperatures. A small addition of ZrO_2 to the heavy metal composition (sintered at $2550^\circ F$) decreases the density of the material, but increases the hardness not only at room temperature, but especially at elevated temperatures. In this composition the ZrO_2 particles are partially or totally enclosed by the growing tungsten particles and they regulate the grain growth of tungsten to a certain extent. No final results, however, have been achieved with this kind of heavy metal-ceramic composition.

Compositions such as the above mentioned, with small percentages of oxides or silicates admixed to metals, seem to be less promising than those with a smaller percentage of metal powders (up to 30 or 40 pct) added to a higher percentage of ceramic raw materials. Among ceramic materials, alumina is of special interest. Among the physical properties, the high melting point of $3720^\circ F$, the resistance to practically all gases and vapors except fluorine) up to $3180^\circ F$ and the excellent mechanical properties, which are retained at elevated temperatures, are outstanding. For ceramic purposes, sintered alumina is to be fired at a temperature of about $3270^\circ F$. At this temperature the material shows a definite crystal growth and the crystals grow up to approximately ten times their original size.

Mixtures of alumina and iron with 40 to 70 pct alumina were developed in Germany during the war. These compositions were used for turbine blades and the results were promising.

At Ohio State University tests were made with mixtures of alumina and chromium powder

which showed surprising results. Seventy pct alumina (100 pct less than 25 microns and 50 pct less than 5 microns) were dry-mixed with 30 pct chromium powder. Wax was added by hot-mixing for dry-pressing the composition. Samples were pressed at pressures varying from 20,000 to 60,000 psi and sintered (after being dewaxed) for approximately 8 hr with $1\frac{1}{2}$ hr at the maximum temperature of $3075^\circ F$ in an atmosphere of pure dry hydrogen. The specimens were broken in cross bending at room temperature for relative strength data on a 1.75-in. span. Similar specimens received 10 cycles of temperature shocks ($2410^\circ F$).

These temperature shock treated specimens showed an increase in cross-bending strength up to 75 pct. The cause for this increase in strength is not yet known; no thermo-chemical change due to the heat treatment could be observed by a microscopic examination, but the more porous samples showed a marked amount of oxidation of the chromium particles. The particle size of the raw materials plays a very important role in this case; the strength at room temperature and especially the strength after the thermal shock treatment change considerably with the size of particles. It seems that a certain similarity exists between the thermal shock treatment of cerametallic compositions and the quenching treatment of the metals.

The problems of high-temperature resisting materials can also be solved by developing multiple-layer materials; for example a metal layer covered by ceramic layers. The metal layer is supposed to give the material the high strength and the ceramic layers will furnish the corrosion resistance. Combinations of a similar type, in which solid metal parts are covered by enamel or refractories, were not discussed by Hausner, because they are not products of the metal-ceramic (powder metallurgy) technique and because they are not manufactured by sintering. Sintered products using one or more layers of metal powders and one or more layers of ceramic powders, both types of layers made from powders, compacted together and then heat treated, should be of great importance for the development of heat resisting materials.

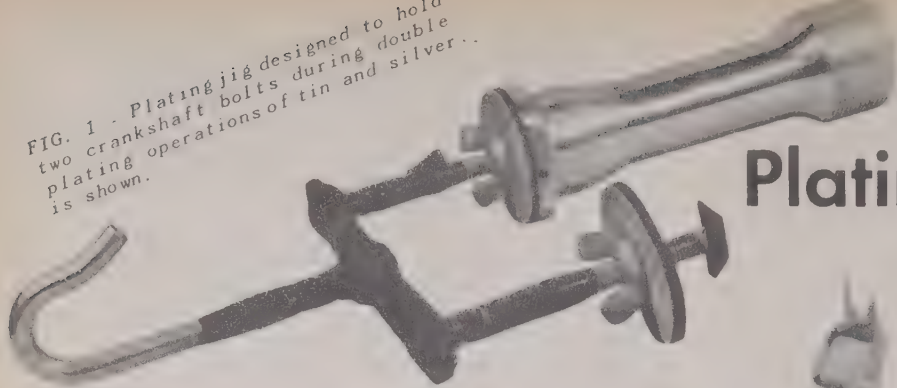
Hausner showed that in most cases it is not complicated to press parts of different materials, because the adhesion between compacted metal and ceramic powders is generally fairly good. The pre-pressing of the first layer (metal or ceramics) and compacting it together with the following layers presents hardly any problem. The problems, however, start with the sintering process. The following conditions have to prevail for sintering two or more layers of different materials:

- (1) There should be a chemical reaction between the surface of the metal and the surface of the nonmetallic particles.

- (2) The shrinkage—and not only the final total shrinkage, but also the shrinkage in every single phase as a function of temperature over the complete range from room to the sintering temperature—must be similar for the metal and the nonmetal layers.

- (3) The thermal expansion coefficient of the sintered product is to be the same for all the different layers.

FIG. 1 - Plating jig designed to hold two crankshaft bolts during double plating operations of tin and silver... is shown.



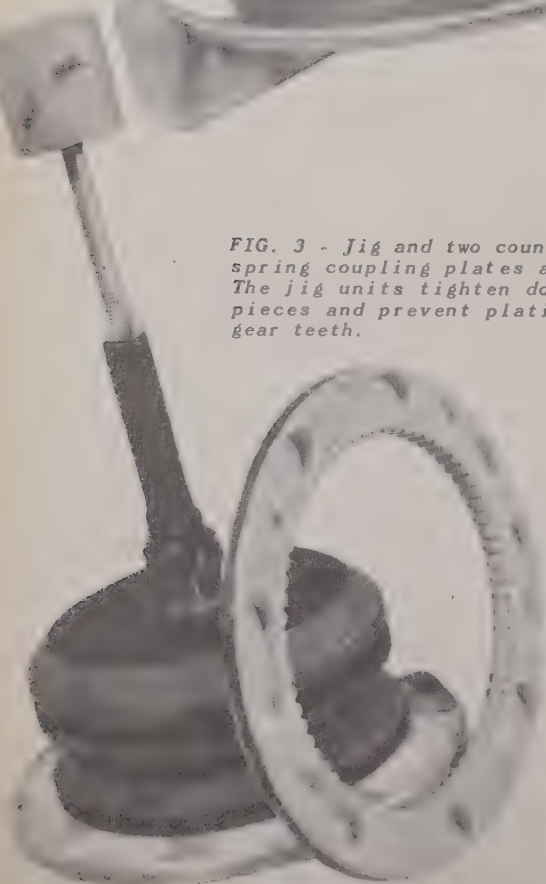
Plating Technique

By JOSEPH ALBIN
New York

FIG. 2 - Two bronze cam bearings are mounted back to back in jig for lead-indium processing. The circular anode, concentric to the bearing faces, has a vertical member for electrical contact.



FIG. 3 - Jig and two counterbalance spring coupling plates are shown. The jig units tighten down on the pieces and prevent plating on the gear teeth.



DEVELOPMENT and standardization of electroplating techniques at the American Airlines main overhaul base in Tulsa has led to well systematized schedules and procedures for rebuilding worn airplane engine parts.

Such repair plating jobs require high precision and control, but have proved to be sufficiently standardized to permit the development of jigs and establishment of the routine practices necessary for attainment of the economy and promptness characteristic of mass production shops.

To assist in attaining uniformity and conformance to manufacturers' specifications, process guidance sheets, indicating step-by-step procedures, have been prepared for each operation. Also close laboratory control of the plating baths, cleaning solutions and related process ingredients is maintained to assure standardized, high quality work.

In this connection, the most frequently tested bath is that of the indium solution for which the rate of deposition is determined daily with a chemical analysis every week. Other plating baths are regulated by weekly analyses. Accessory solutions, such as alkaline cleaners or acidic bright dips, are checked at less frequent intervals.

Before parts are received in the plating room they have been passed through a cleaning solution, such as Magnus 755 or Turco Fuzee, or perhaps have been soft grit blasted or sandblasted. The first step in the plating room is always to

for Rebuilding Aircraft Engine Parts

Rebuilding worn airplane engine parts involves a variety of high precision electroplating techniques. This article describes an installation where laboratory developed procedures and jigs have established standardized, production type operations and resulted in substantial savings. Jig designs and process specifications are given for several types of electrodeposition including the double plating of tin and silver, lead-indium work, silver plating for soft bearing surfaces, press fit coatings and plating to build up worn surfaces to dimension.

pass the parts through a vapor degreaser, and from this point the process specification sheet for the particular part takes over.

A typical operation is the rebuilding of a crankshaft bolt, shown mounted on a plating jig in fig. 1, which is double plated with tin and silver over a 0.0001 in. copper flash in order to cope with service and assembly introduced strains. The head end of the bolt is silver plated to a thickness of from 0.0004 to 0.0006 in., and tin is plated over the thread end to a point where it meets or overlaps the silver on the cylindrical shaft as near to the head end as feasible. The tin plate for this area should be between 0.0002 and 0.0004 in.

The part was designed so that the silver on the head will yield and deform the amount required for optimum stress-strain distribution under the load of joining the shaft in the assembly. The tin coating on the thread end is to prevent galling and sticking.

Two crankshaft bolts are plated at one time on the completely masked jig, shown in fig. 1; which was designed to give uniformity in the overlap of the two coatings.

To follow the rebuilding operation through its specification sheet processes, the worn crankshaft bolts are prepared by being degreased, baked at 325°F for 2 hr, anodically stripped of tin plate in a hot alkaline tin stripper, anodically stripped

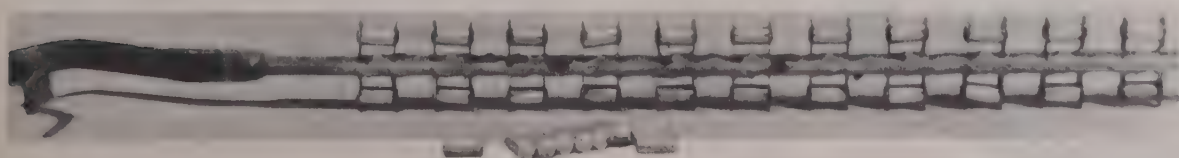
of silver in a caustic cyanide bath, and finally stripped of the base flash of copper in a chromic-sulfuric acid bath, again with the part the anode. A final rinse is given the bolt and the surface is then prepared with a pumice and alkali rub.

The part is rinsed cold and hot, and blown dry, a fitting is attached to the thread end and the fitting and bolt shank up to the line to which silver is required are masked with lacquer. Another pumice and alkali rub is given to obtain a free rinsing surface. A dip in an acid pickling bath for 15 to 30 sec at room temperature, followed by another rinse and finally a dip in caustic cyanide for 30 sec at room temperature ready the piece for plating. The cyanide dip produces better plate adhesion.

The pieces are drained briefly on removal from the cyanide and immersed in the copper plating bath with the current off. The jig is agitated for a few seconds, copper is flashed on at a current density of 35 to 45 amps per sq ft for 1½ to 2 min; and finally a quick rinse and dip in the caustic cyanide ends the copper striking cycle.

To silver plate over the copper, the fixture is immersed in a silver strike and agitated with the current on so that a flash of silver is applied at 30 amps per sq ft for 20 sec. The work is removed and inserted in the silver plating bath and agitated while 0.0004 to 0.0006 in. of silver, using bath data for deposition rate, are plated at 10 to 40 amps per sq ft.

FIG. 4 - Jig used in the silver plating of taper rollers where end areas are not critical holds the rollers between spring clips.



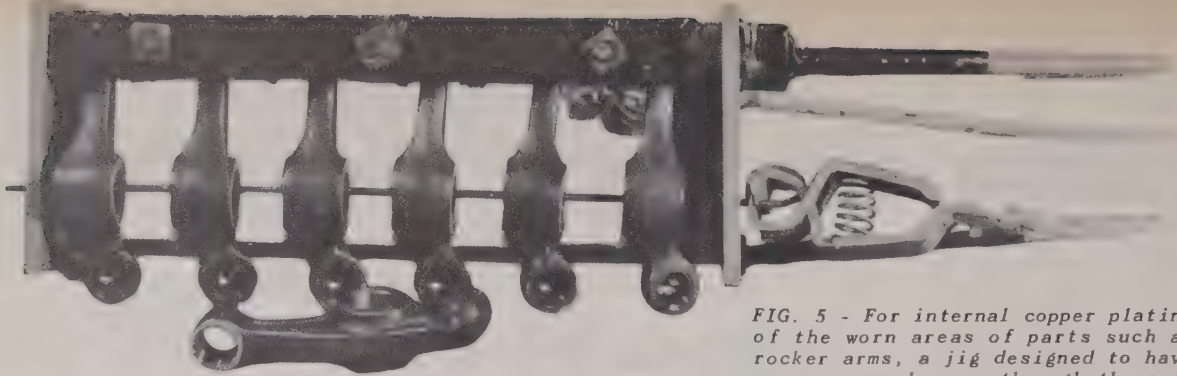


FIG. 5 - For internal copper plating of the worn areas of parts such as rocker arms, a jig designed to have a copper anode pass through the centers of the part interiors is used.

After rinsing, masking material and the fittings are removed. If copper creepage has occurred under the masks, pumice and water rubbing will remove the stains. All the silver except for the 0.0625-in. edge which receives the tin overlap is masked with Koroseal tape. The exposed thread end and shank are brushed with a clean, pumice free brush and caustic cyanide to obtain a free rinsing surface, are rinsed thoroughly, dipped for 15 sec in an acid pickle at room temperature, rinsed again, immersed in caustic cyanide and the exposed silver edge is brushed again.

The jig is immersed in the tin plating bath and 0.0002 to 0.0004 in. of tin is deposited. The work is removed and rinsed, the masking is detached, and creepage stains are removed with pumice and water. The pieces next are hot rinsed, blown dry, baked at 325°F for 2 hr, cooled and finally dipped in Tooltex for surface preservation and protection until the time of engine reassembly.

Modern airplane engines, and to a lesser extent diesel, automotive and stationary engines, operate with comparatively high bearing loads and at elevated temperatures, conditions that have led manufacturers to turn to bearings having low fatigue. Cadmium, lead, copper-lead and cadmium-nickel alloys, having good strength and wear properties, have all been used.

Many of the properties of lead which makes it suitable as a bearing metal are improved by small additions of indium, commonly accomplished by plating indium onto the lead and alloying by heat treatment. Alloying the lead with indium markedly changes the crystalline structure of the lead and gives a bearing surface which is harder, tougher and more resistant to corrosion by the lubricant. The addition of 1 pct indium increases

tensile strength from 1600 to 3000 psi and additions of up to 8 pct indium can change Brinell hardness from 3.11 to 7.28.

The lead-indium method for reprocessing bearing surfaces consists first of applying a lead plate of a thickness varying from a few ten thousandths of an inch to 0.002 in., followed by deposition of 4 to 8 mg of indium per sq in. The indium is diffused into the undercoat by baking at 350°F.

Lead-indium plating normally goes over a silver plate supported by a steel shell. Indium can also be plated onto and diffused into other metals, as copper, cadmium, zinc, tin and gold.

Bronze cam bearings are commonly resurfaced at American by this lead-indium process. Any indications of pitting, corrosion, lead washing or exposure of the underlying bronze that could allow contact with the mating surface call for rebuilding.

Lead-indium plating requires comparative exactness, so the operations must be carefully checked. The indium content is sufficiently critical to warrant daily determination of deposition rate for guidance of the platers. Cyanin, a solution type bath made by Indium Corporation of America, is used with stainless steel anodes for indium deposition.

In the jig used for plating bronze cam bearings, shown in fig. 2, two cams are placed back to back. Experimentation showed that a circular anode, positioned as shown, gave the best plating

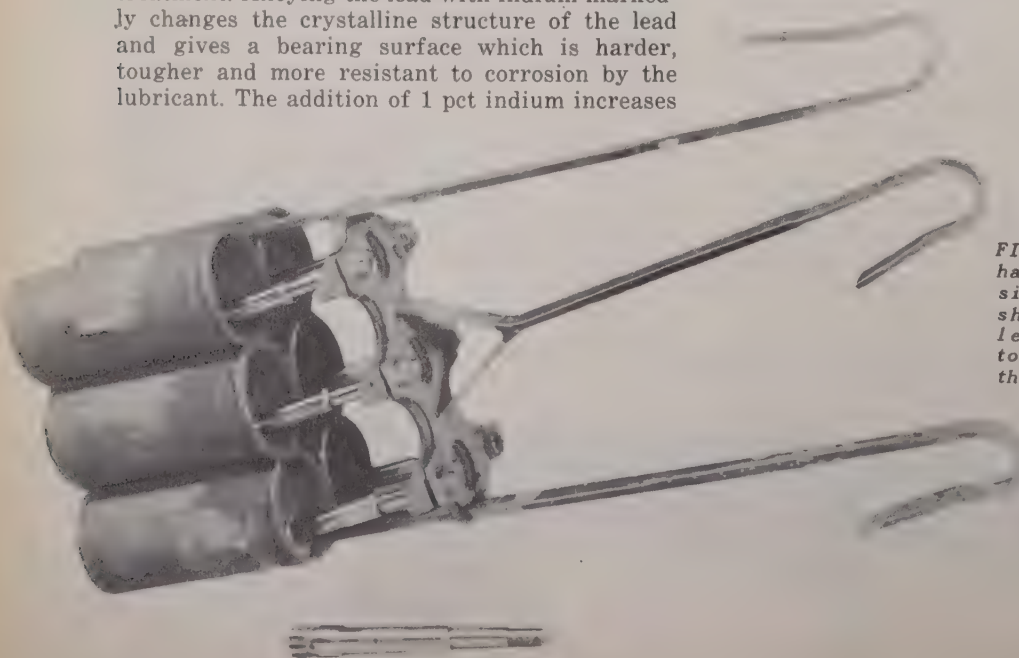
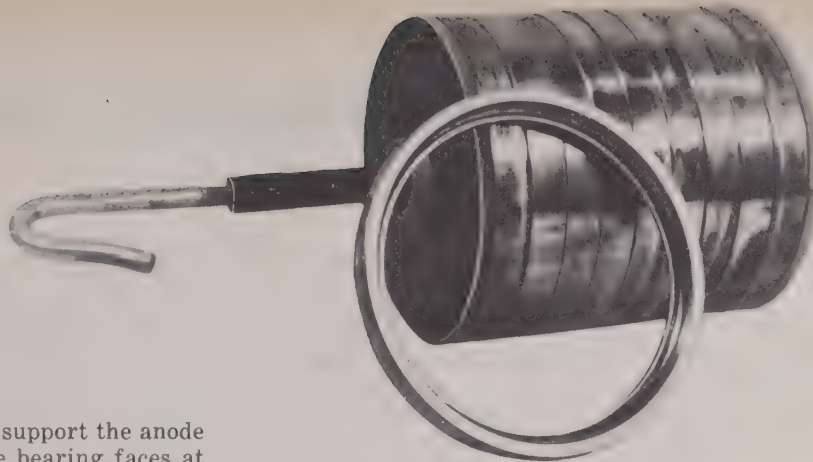


FIG. 6 - Jig for bright hard chromium plating of six alternator shafts is shown with the cathode lead partially removed to give a better view of the conforming lead anodes.

FIG. 7 - Jig to enable copper plating of outer cylindrical surfaces of propeller bearings rings tightens onto the pieces to make masking of the intricate side and inner surfaces unnecessary.



results. A fitting is provided to support the anode outside and concentric with the bearing faces at a position $1\frac{1}{4}$ in. away. Two bearings are mounted together in a spider assembly with wingnut clamps so that there is about $1/16$ in. space between them. The assembly, which carries the bearings through waxing and stripping operations, has support brackets and is made of Mica throughout.

Special care is taken with the lead bath to secure a plate of exact dimension. The bath is agitated just enough to keep the solution circulating and since it is an acid type bath it is carefully skimmed. Amperage control is precise by means of a carbon pile resistor with vernier.

American's specification sheet for this operation calls for the following operations in preparing the bearings: mount bearings on fixture, wrap painter's masking tape on the old lead-indium surfaces leaving the crevice between the bearings open, dip in masking wax, cool and harden, remove tape and wax on lead-indium area, strip the lead-indium by dipping in an acetic-peroxide bath, rinse, clean with pumice and alkali, rinse thoroughly and keep immersed in water until ready for lead plating.

The lead plating process steps are: Place the assembly in the lead plating bath; plate, using 7.5 amps per sq ft, 0.0012 in. of lead, absolute limits being 0.0010 to 0.0015 in.; rinse and during rinse replace lead anode with a stainless steel anode; dip in caustic cyanide for 5 sec to neutralize and finally rinse. The lead is not to be touched or allowed to remain in the air during these steps.

For the indium plating: Immerse in the indium bath, plate to obtain exactly 6 mg per sq in. of indium, absolute limits being 4 to 8 mg, remove assembly to drag out drain board and collect rinsings from brief spraying of the assembly, transfer to rinse tank, rinse hot, blow dry, bake in oil at 340°F , $\pm 10^{\circ}$, for 2 hr, trim excess lead along edges if necessary and finally dip in light oil.

Silver surfaces without lead-indium topcoats, for soft smoothly working bearings and for corrosion prevention, are used in counterbalance spring coupling plates, shown in fig. 3, and also in tappet rollers, fig. 4. The procedure for silver deposition used in crankshaft bolt reprocessing substantially applies to these parts.

The coupling plate jig, shown in fig. 3, has been designed to handle two plates at one time and to prevent plating on the teeth. The plates are retained between the two covers which are

tightened and secured by the wingnut. Only the outside surface and the slots, which serve as seats for springs mounted between a pair of such plates in the assembled engine, receive plating. The fixture is especially time saving in eliminating the operation of masking the teeth.

The fixture for the tappet rollers, fig. 4, which has spring clips for retaining a roller by its ends where surfaces are not critical, was especially designed for high output per bath. The rollers are plated to 0.0006 in. on the cylindrical surface.

Building up a dimension on worn surfaces is done with copper on parts such as the rocker arms shown in fig. 5 or with bright hard chromium where strength is required. Light copper coatings are generally used for press fit applications, or for the same purpose some parts, such as crankshaft bushings and counterweight rollers, receive a copper coating followed by a thin lead plate. For the latter parts procedures call for stripping, anodic electrocleaning, flashing 0.0001 in. of copper and then no more than 0.0002 in. of lead on the part. Baking of the pieces at 325°F for 2 hr before and after plating is specified.

A novel rig for building up alternator shafts with bright hard chrome, shown in fig. 6, has proved very economical of materials and effort. The anode consists of 6 lead cylinders connected together by lead joints, with the inner radius of each cylinder designed to be 1 in. from the surface of the part. After conventional cleaning of the alternator shafts, the jig is set into the chromium bath, etched anodically by reversing current and plated.

The jig in fig. 5 is a laboratory effort to arrive at a mass production method for repairing the heavily worn inside diameters of rocker arms. The pieces are fastened to a common cathode lead and a copper anode positioned to go through the centers of the pieces allows proper plating of the worn surfaces.

To save the manhours absorbed in stop off work of intricate part areas, the jig in fig. 7 was developed to allow the plating of only the outside cylindrical surface of a propeller bearing rig. The contiguous arrangement of the rings with the side areas in tight contact with one another prevents coating of any areas other than the outer surfaces. Build up is done with a rather light copper plate.

The Openhearth Furnace —

Following a discussion, in the first part of this article, of the responsibilities of the refractory manufacturer in furnishing the steelmaker with a high quality silica brick, the author points out to the openhearth operator control measures that can be taken in improving roof performance. In this concluding part of a two-part article, the author discusses various furnace construction and operation features and shows how they affect roof life. The influences of factors, such as heating up of roofs, maturing of silica bricks and roof temperature control, in particular, are discussed and procedures are suggested for obtaining optimum results in the use of silica brick.

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THE height of the roof above the sill level is one of the most critical dimensions in the openhearth furnace. If the roof is too high, it will have a good life, but the output will be low. If on the other hand it is too low, the furnace may drive well during its campaign, but the roof life will be short. In most works, roofs have been moved up and down with a view to either improving brick life or increasing production; the final height of the roof above the sill level being surprisingly constant (generally between 6 ft and 7 ft 6 in.) over quite a range of furnace sizes.

Another design feature having a very marked effect on both output and roof life is that of the port. This question has been studied and reported on in some detail in the Iron & Steel Institute Special Report No. 37¹. The results obtained favored the venturi type of port, because it was found to give a high velocity flame that kept well down on the bath and because air coming in over the top of the gas stream enabled higher downward heat flows to be obtained for a given roof temperature than was possible with more conventional ports.

Preliminary studies, using transparent plastic water models and aluminum powder for visualization of flow, suggest that the design question is even more complex than is realized. A great

of the furnace actually proceeding in the opposite direction to the main stream and at considerable velocities. It is hoped that the study of such eddies and the effect of changes in design on the flow pattern will enable furnaces to be built that throw a reduced strain on the roof without decreasing production.

The inclination of the gas port or oil burner both in a horizontal and in a vertical plane is also of great importance. It is generally agreed that if the access of the port coincides with the center line of the furnace the flame will tend to do more damage on the backwall side of the roof. This is generally attributed to air infiltration and is frequently overcome, at least in part, by inclining the port or burner slightly towards the frontwall. Whether the excessive wear frequently experienced over the taphole in sloping backwall furnaces is due to such displacement of the flame, or to the fact that this particular part of the roof is not cooled like the rest of the roof by the presence of the cooler charge beneath, has yet to be proved. It should, however, be pointed out that the roof temperature normally floats between the flame temperature and the bath temperature, and that if it was not for the cooling effect of the charge the roof would very quickly melt. It is for this reason that the fuel must be cut when the refining period is reached and the bath no longer absorbs large quantities of heat.

Silica roofs are normally built with rigid skew-backs and no expansion allowance is made across the arch. The expansion at the top and bottom of the brick is much the same with silica, but is quite considerable (slightly over 1 pct) and leads to a considerable rise during the heating up

In the first part of this article, THE IRON AGE April 29, the author proposed techniques whereby the quality of silica bricks could be improved. Also presented was a discussion of the causes and prevention of spalling.--Ed.

deal of eddying occurs, the gases in certain parts.

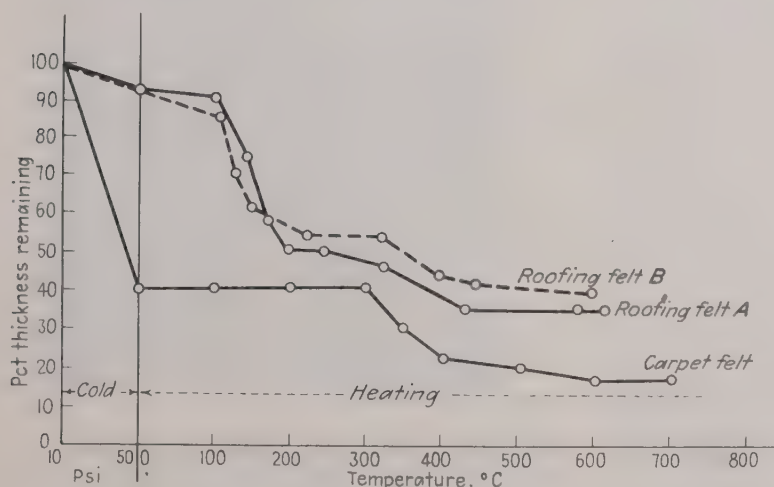
Making the Most of Silica Roofs

period, usually of the order of 6 in. If this is not controlled, there is a tendency for the roof to "break its back," i.e., to open up along its length at the highest point. This effect is particularly marked if the bricks are soft fired and after-expansion is added to the normal thermal expansion. The formation of such a gap, which frequently results in internal spalling and consequent guttering of the roof, can be greatly reduced by placing refractory pillars between the roof and the crossties.

For very large furnaces the maintenance of stability encourages the use of a ribbed construction, but for smaller units bonding of the bricks is preferable, since it makes for stability when the roof gets thin, enabling repairs to be carried out that would be impossible with a ribbed roof.

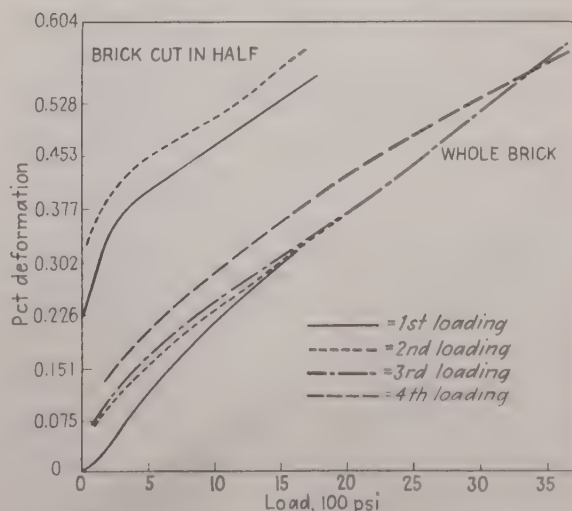
the temperature range in which most of the expansion in a silica roof occurs. Carpet felt can also be used, but it is always difficult to know the exact allowance given by it since it is very compressible when cold.

In the test shown in fig. 11, the initial application of a load of 10 lb was made to simulate the compression occurring during the setting of the roof bricks. It was found with the domed roofs of arc furnaces that the allowance of the full theoretical expansion, about 1.25 pct, is desirable both circumferentially and radially. There is, however, no doubt that the rough surfaces of the brick, which prevent perfect fitting, and yet are capable of yielding under a relatively low load, do result in a certain amount of expansion allowance.



LEFT
FIG. 11 - Compression of various types of filling for expansion joints on heating up. Data courtesy Iron & Steel Institute.

BELOW
FIG. 12 - Stress-strain relationship for silica bricks. Note the much larger deformation of two half-bricks in contact with one another. Data courtesy Iron & Steel Institute.



Where expansion joints are used, e.g. along the length of the furnace, attention should be paid to the material used. Cardboard and wood are frequently employed, but whether they burn out at the same time as the major expansion of the roof takes place is very problematical. Tarred felt is considered the best material for this purpose, because it is rigid enough when cold to allow of accurate allowances being made and yet softens readily under pressure on heating to only 100°C (212°F).

Work carried out in the author's laboratory on such expansion joint materials in connection with electric arc furnace roofs, and reported in the Iron & Steel Institute Special Report No. 32, shows that under a load of less than 50 psi (see fig. 11), tarred felt starts to collapse quite readily above 100°C (212°F) and has done most of its shrinking at 300°C (572°F). This happens to be

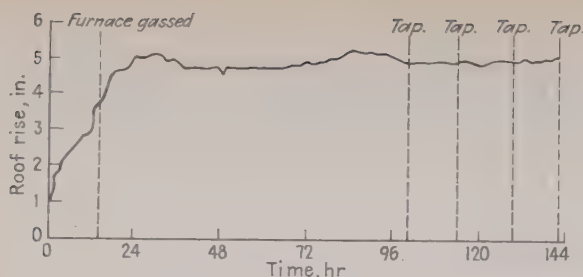


FIG. 13 - Variation of roof level during heating up and service.

Tests carried out by the British Refractories Research Assn. show considerably greater deformation when two half-bricks are compressed in contact with one another than when a similar load is applied to a whole brick. Some of the curves obtained are reproduced in fig. 12. The results for the whole brick show that there is some permanent deformation when the first load is applied, but on a repeat loading the strain curve becomes reversible. Under a load of 400 psi the deformation of the whole brick was 0.085 pct and that of the same brick cut in two was 0.151 pct. Since the effect will be additive, the total expansion allowance in brick wear due to compression at the interfaces may be quite appreciable. However, roof loadings should rarely be as high as 400 psi and it is therefore unlikely that this crushing of the brick faces can account for more than one fifth of the total expansion allowance required.

Another point that frequently requires emphasis is the need for correctly-aligned skewback channels of adequate strength. Here again the author's most convincing experience has been with arc furnace roofs. At one plant two types of electric furnaces are employed, both of 20 tons capacity and very similar in design, except that one has a domed roof and a strong ring while the other has a flat centered roof and a weak ring. It was found repeatedly that the flat centered roof gave a shorter life and so this furnace was fitted with a domed roof. Immediate improvement in roof life occurred, but the results were still poorer than those obtained on the other furnace. It was therefore decided to strengthen the roof ring and this resulted in an increase in life from 55 to 93 heats. Research on roof stresses has shown that even with perfectly smooth material it is extremely difficult to get even stress distribution. It is certain that where there is appreciable departure from the design structure, for example, when piecing-up involving brick cutting, is resorted to, very peculiar stress distributions will result.

Following a series of roof failures in one plant, an attempt was made to follow the movement of a roof throughout the early part of its campaign. This was done by placing a small weight on the center of the roof and attaching it by means of a wire and pulleys to a recorder on one of the main shop columns. Fig. 13 shows the result obtained. It will be seen that the roof rose some 4 in. before it was gassed and another 1 in. after gassing. Once the roof was brought into service and steel was being made, however, the variations

were extremely small (of the order of $\pm \frac{1}{8}$ in.) and such as might almost be accounted for by shop vibrations.

A great deal remains to be done on the question of roof design and some improvement in roof life can be expected from further research on this subject. It is highly probable for example that silica roofs would last longer if given the detailed attention and care found necessary for the maintenance of a chrome magnesite roof on an all-basic furnace.

Heating Up of Roofs Important

There is a wide variation in the care shown in different melting shops during the heating up of silica roofs. In some plants time is wasted, several days being used to heat up a roof, while in others the heating up period may be as small as 6 hr, which in the author's opinion is dangerously short. The heating schedule first recommended by A. E. Dodd,

0°-200°C (32°-392°F) —25°C(45°F) per hr

200°-300°C (392°-572°F) —12.5°C(22.5°F) per hr

300°-600°C (572°-1112°F) —50°C(90°F) per hr

is considered very reasonable and, according to

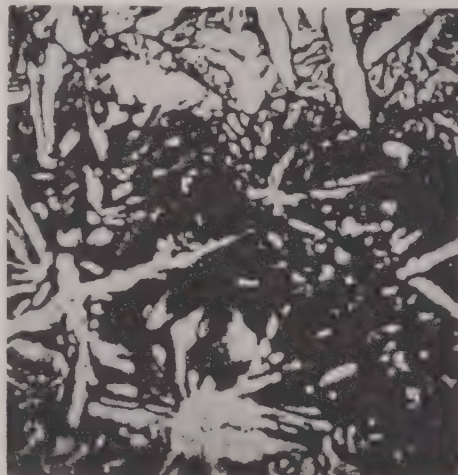


FIG. 14 - Large tridymite crystals converted to cristobalite after migration to the working face. Huggill⁴

the work of Howie, allows a safety margin of the order of 6:1. This may sound excessive but in view of the importance of reaching the top temperature without cracking the roof and the large number of possible snags during heating up, it is considered quite small enough.

In Great Britain, furnaces are generally heated up with coal or with some type of external stove. The use of wood, which is fortunately becoming infrequent, can lead to extremely rapid rises in temperature followed by equally rapid falls. Examples have been observed where bricks heated up in this way have traversed the alpha to beta cristobalite change no less than five times (three times alpha to beta and twice beta to alpha) before the operating temperature was reached. Even after the maximum danger range of 200° to 300°C (392° to 572°F) has been passed,

it can easily be entered again by premature raising of the furnace damper with a consequent inrush of cold air.

Excellent curves can be obtained using coal fires provided the stokers are sufficiently conscientious, but the best method so far tested is the use of external stoves. These generally consist of a grate on which coke is burned, the waste gas temperature being varied by changing the proportion of air passing through and over the grate. Such stoves are sometimes fitted with a controller to insure that the temperature does not rise above a given figure in a certain time. The necessity for using some measure of control during the heating up period is still not accepted by many steel plant managers. Although they would be the first to agree that a man cannot judge temperature by his eye, they are not alarmed by the fact that he is attempting to judge it during the heating up period without even this elementary guide.

The justification for lack of control is frequently that no spalling is experienced during heating up, but it is almost certain that many of these so called "good heat-ups" result in the cracking of a large number of bricks at a point well behind the working face and that it is only when odd bricks become displaced later in the campaign that the spalling begins to be serious. Roofs have even been observed during repair periods to consist of two half-roofs, one above the other, the cracking being almost continuous from front to back.

Another risk frequently ignored is that of premature shutdown. Unless unavoidable, a new furnace should not be lit a few weeks before it is due for a shutdown. Once a roof has matured and become more or less monolithic it is comparatively safe to cool it, but a period of at least 3 weeks is desirable to allow this change to occur.

Maturing of Silica Bricks

Most openhearth furnace operators are familiar with the general theory of maturing of silica bricks. This can be summarized briefly as follows:

(1) Part of the bond in the brick, notably the lime and alumina, migrates upwards from the hot face and concentrates in a zone several inches back in the brick.

(2) The working face changes from a mixture of cristobalite, tridymite and quartz to a intercrystallized cristobalite zone of 1 in. or more in thickness.

(3) The section between this first zone and the low melting point zone changes mainly to tridymite.

(4) Iron oxide and lime are picked up from the furnace atmosphere, with a considerable proportion of this iron oxide remaining at the working face, probably as interstitial liquid.

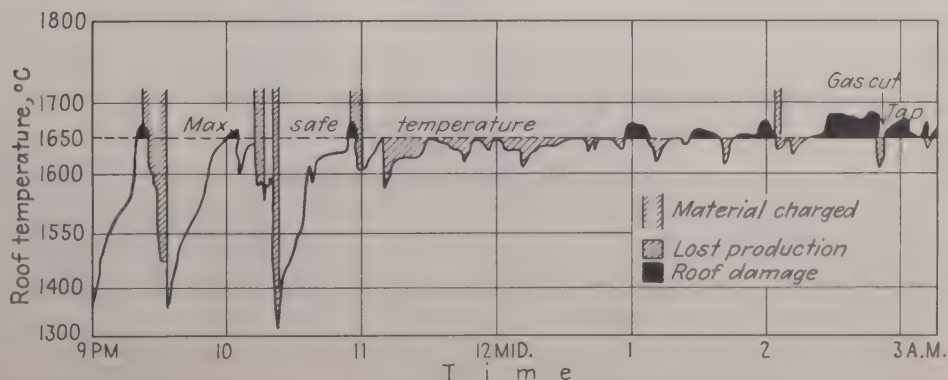
The time for these changes varies rather peculiarly from furnace to furnace, but a period of at least 3 weeks is generally required for the above conditions to be reached. During this period the first 1 or 2 in. of the bricks tends to fuse together, presumably due to their pyroplastic nature. The roof rise during the initial heating up will tend to limit contact to the lower edges, but softening of the bricks will result in the zone of contact spreading. It is generally agreed that a roof matured in this way is capable of standing up to more severe conditions than a new roof. Whether this is due to the physical change in the working face, e.g. the reduced permeability, or to the effect of glazing on heat reflection, has yet to be proved.

One of the most interesting points in connection with maturing and roof wear is the origin of so-called "rat-holes." These are cavities which appear on the faces of some of the bricks and frequently penetrate to a depth of 2 in. or more. At first they may be quite small, but they tend to increase in size until they undermine the surface of the brick and lumps of material begin to fall away. W. Hugill showed⁴ that some of the crystals in the working face, which can be shown both by microscopic and X-ray examination to be cristobalite, have the external form of tridymite. He took the view that these crystals had been brought down from the relatively low melting point tridymite zone above suspended in fluid material, and had subsequently been converted to cristobalite (see fig. 14) due to the temperature being above 1470°C (2678°F). This view has been supported by recent American work, which also suggests that migration of fluid material from within the brick and subsequent dripping of this material from the hot face is the original cause of rat-holing. If this view is correct, the phenomenon can hardly be considered as pathological, though it may be exaggerated by irregular distribution of impurities within the original brick.

Furnace Roof Temperature Control

Roof pyrometry is by no means a new subject,

FIG. 15 - Curve indicates loss of production and damage to roof due to inadequate control over roof temperature.



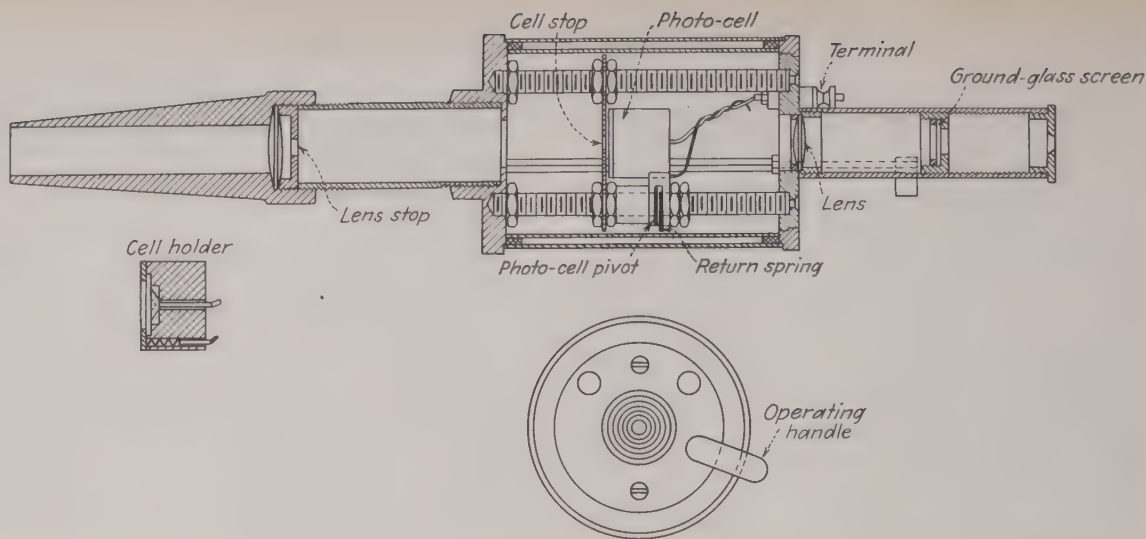


FIG. 16 - Schematic sketch of photoelectric roof pyrometer. Courtesy Iron & Steel Institute.

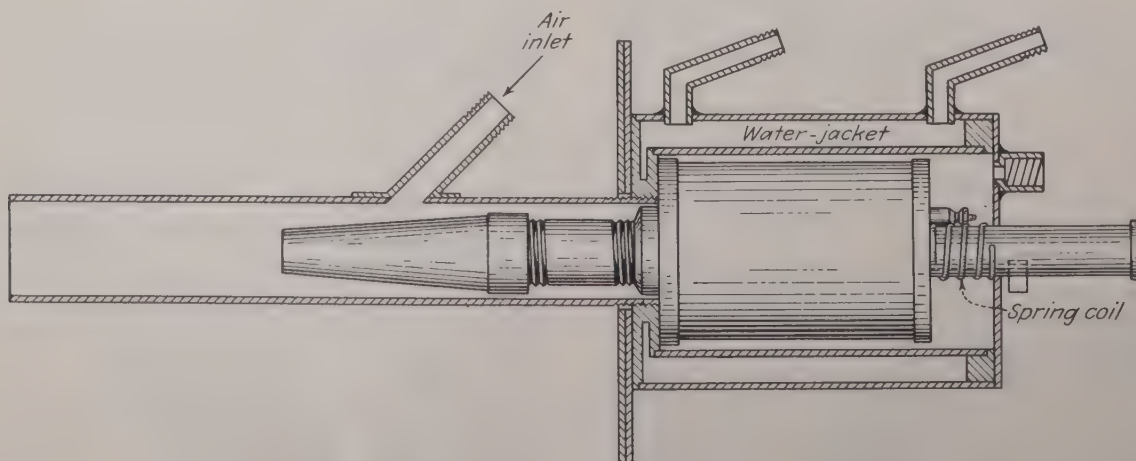
although it is still ignored in many melting shops. In others it has been tried, but dropped for a variety of reasons. An objection that holds that the technique is dangerous because it only tells the temperature of one part of the roof, while another part may be considerably hotter, is quite rational, while others are mainly associated with insufficient maintenance. Thus the sight hole can always become blocked by slag drip, the lens shield can be damaged by flying particles, and if the cooling air is not filtered, the lens may get dirty. Much more serious than these is a failure in water cooling which may lead to overheating of the instrument and consequent departure from calibration.

To be certain that the hottest spot in the roof is being noted would require either a battery of pyrometers or something like a television scanner. In some works two or three pyrometers are sighted through the backwall on to the ends and center of the roof. These can be used in con-

junction with one recorder, but this considerably increases the maintenance problem. Where roof pyrometers are to be linked with fuel flow, it is very desirable that more than one instrument should be included and that the one reading highest should take control of the flow. Any wide difference in reading between the instruments would then be the subject of inquiry. The trouble may be something simple, like the blocking of a hole, or something more complicated, like a departure from calibration. It should in any case be emphasized that the fitting of roof pyrometers while of great assistance to the melter does not absolve him from responsibility for his roof. It does show him when he is approaching the danger point and, therefore, when the roof requires inspection.

If a roof pyrometer is fitted to a furnace normally operated without one, the kind of curve obtained is shown diagrammatically in fig. 15. There are two main features of such a curve:

FIG. 17 - Assembly of photoelectric roof pyrometer in water jacket. Courtesy Iron & Steel Institute.



(1) the roof is generally found to have been heated above its maximum safe temperature for several minutes during the cast, and (2) at other times more fuel could have been carried without any risk of roof damage.

It is safe to say that the melting point of silica is so sharp that 5 min at a temperature of say 20°C (36°F) above the safe point will do more damage than 5 hr below this temperature. It can also be confidently stated that the total charge to tap time could be reduced by from 1 to 2 hr on many casts if the fuel was controlled to keep the roof temperature at the maximum safe level during charging and melting. Where low carbon steels are being made, this temperature may be held during refining, but with steels of higher carbon content lower roof temperatures may be needed if the tapping temperature is not to be excessive.

rently in use; the total radiation pyrometer which normally includes some form of thermocouple, and the photocell. The first type is still the most commonly used, though the photocell has certain advantages; notably its extreme sensitivity in the high temperature range. A new type of photocell instrument now being used in this country, recently described by Land⁵, contains a selenium barrier-layer photoelectric cell, and is more compact than the normal British total radiation unit. The general arrangement of the unit is shown in fig. 16. The unit is linked to an electronic amplifier, which can be mounted at any convenient point, and thence to a recorder. The amplified current can be used if it is desired to operate a solenoid and thence a valve in an oil servo motor. This controller can then be linked to the oil flow.

FIG. 18 - General view of photoelectric roof pyrometer mounted on the back wall above the tap hole. Courtesy Iron & Steel Institute.



In the openhearth furnace trials reported in the Iron & Steel Institute Special Report No. 37,⁴ the charge to tap times was roughly 20 pct below those normally obtained, in spite of the fact that

⁴ W. Hugill, *Journ. Iron & Steel Institute*, 1941, II, 144, p. 250.

⁵ T. Land, *Journ. Iron & Steel Institute*, 1947, 155, p. 568.

the furnaces were smothered with instrument holes and that some 9000 gal per hr of water were used to cool the test instruments. Of this saving 5 pct may have been due to special scrap, but the other 15 pct was due mainly (1) to reduction of air infiltration by furnace pressure control, and (2) the attempt to reach the maximum roof temperature as quickly as possible and then maintain it.

Two main types of roof pyrometer are cur-

The water cooling jacket and the method of introducing air to reduce the risk of dirt or flame entering the instrument are shown in fig. 17, while fig. 18 shows one of the early installations mounted on a backwall. Given ordinary supervision such an instrument will maintain its calibration for a period of 6 months or more.

There is still no close agreement as to the maximum safe operating temperature, though the range has now been narrowed to 1650° to 1680°C (3002° to 3056°F). The closeness with which the top temperature is approached would appear to be a measure of the boldness, or confidence in calibration, of the furnace operator, rather than any difference in the roof refractories employed. The author feels that as long as calibration depends on human observation a safety margin of 30°C (54°F) is not unreasonable; the maximum temperature, 1680°C (3056°F)

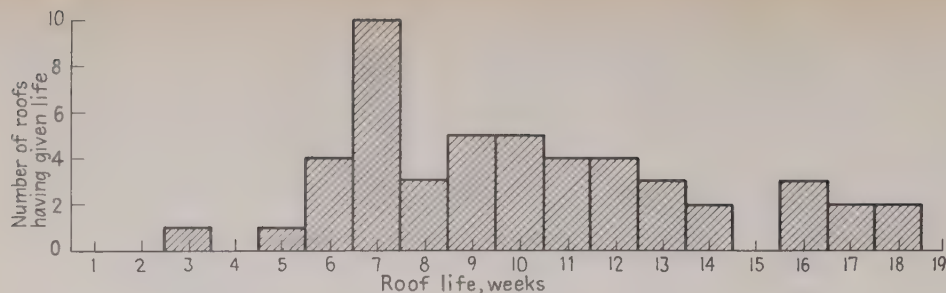


FIG. 19 - Frequency curve for roof lives in cold pig fixed furnace melting shop.

being that at which roofs have actually been observed to melt. There is still some doubt among melting shop managers as to whether the temperature recorded is a correct one, it being asserted from time to time that the value must be influenced by absorption by gases in the furnace, reflection from the flame, etc.

The author's experience in using platinum thermocouples as a standard suggests that the values shown by a range of instruments, i.e., total radiation, photocell, disappearing filament pyrometer and thermocouple, only differ by amounts which are of the same order as the errors introduced by the human measurement. One further point, which although obvious, is still frequently ignored, is that calibration of the roof pyrometer can only be carried out satisfactorily at certain periods in a heat. When a furnace has just been charged, it cannot be considered as a black body and the results obtained with different types of instrument may vary considerably. Once however it is substantially flat-melted and the flame is well down on the bath, surprisingly good checks can be obtained.

An illustration of this fact is given by a long series of tests recently made to compare two types of pyrometers. The checks, made during the charging period, showed deviations of as much as 30° (54°F) or even 50°C (90°F) from the value shown by an optical pyrometer. During the refining period the deviations were much smaller, of the order of 10° to 20°C (18° to 36°F). At the completion of a run of several months the instruments were recalibrated by the makers and were found to be substantially as supplied.

It can be recommended, from these experiments, that calibration should only be relied on during the flat melted period, or during fettling, and that even then errors of the order of 10° to 20°C (18° to 36°F) are more likely to be due to the observer than to the instrument.

Roof Deterioration in Service

Fig. 19 is a histogram of roof lives in a hard-driven fixed furnace shop, the furnaces being of approximately 80-ton capacity and charged with cold pig and scrap. The spread in lives is very great, though it could probably be equalled in many other works. An intensive study of the information behind this figure shows that most of the extremes can be readily explained. Thus the roof that lasted only 3 weeks was installed (by necessity) just before a general shutdown of the shop. It did not survive the premature cooling and therefore had to be replaced. The particularly long lives, that is the 18-week roofs, were mostly found to be associated with very considerable repairs, so that the roof life, if corrected, would come much nearer to the average value for the shop of 10.3 weeks.

A diagram of this type shows the futility of attempting to compare brick quality by comparing the life obtained with a new brick in one or more roofs with that of the shop average. Attempts to correlate the less exceptional lives with the properties of the bricks as determined on samples of 12 taken from each roof as it was installed failed to show anything significant, due either to (1) the swamping effect of operational factors, or (2) the nonrepresentative character of the sample.

FIG. 20 - Sideways attack on silica roof bricks leading to separation of working face.



The difficulty in getting a representative sample varies greatly according to the origin of the bricks. In some brickworks the hourly variations in stone quality are very small, but there may be appreciable changes from month to month. In others the hourly changes may be considerably greater than the average variations from month to month. Where these short-time variations occur, it is clear that a consignment may easily contain bricks from a number of batches having radically different properties, e.g., alumina content. If the sample happens to come mainly from a part of the roof which is not typical of the bricks as a whole, then any effect of brick quality on roof life will be obscured.

Work carried out in the United States,* and associated particularly with the split-roof technique as described by Kraner, shows that the alumina content in particular does correlate strongly with roof life if the latter is expressed in terms of a corrected value that allows for patching done during a campaign. The extension of such trials to other works is highly desirable, but their success will depend very greatly on the nature of the variation in quality at the particular brickworks concerned.

Normal wear consists essentially in the absorption of iron oxide and lime by the working face of the brick, with a consequent fall in melting point leading to dripping of the roof. Unfortunately a great deal of the damage to the roofs is not "normal," being due to localized overheating of the roof, resulting, for example, from flame deflection. Such localized melting may also start from thermal shock or pinch-spalling. Bad areas in roofs are attributed from time to time to patches of poor brickwork, but the only evidence found in support of this theory relates to under-firing. The clean ends of bricks in such a patch frequently show normal properties except that they have a high specific gravity. This may lead to a rather high local expansion with consequent "pimpling" of the roof.

A peculiar phenomenon observed in certain roofs, both in Great Britain and the United States, is that of side attack. Fig. 20 shows an excellent example of this process. It will be seen

that this roof is split into two distinct layers and that the under surfaces of both the top and bottom sections have been dripping. This peculiar behavior is probably due to the loss of approximately half the thickness of the roof at some point due to spalling or melting, followed by melting out of the low melting point zone in the adjacent bricks due to these being exposed on the side to the full furnace heat. Since the bricks adhere to the adjacent bricks, they do not necessarily fall down due to the "undermining" but tend to sag as a monolith as this attack proceeds.

Although this phenomenon is comparatively rare, the stepwise wear of roofs is often observed and probably has a similar origin. It is well-known that whereas localized heating normally results in a dish-shaped hole in the roof, wear sometimes occurs in a stepwise fashion, as though half a brick had fallen out, and this was followed by the periodic falling of adjacent half bricks. Such wear may in some cases be associated with the spalling of roofs during the initial heating up, but might be due to the side attack on the low melting point zone.

It is doubtful whether silica bricks have any future if one speaks in terms of decades, but it is certain that silica will hold its place in the steel plant for many years to come, and it is therefore worth while to concentrate on "making the most of silica roofs." The ways in which this can be done can be summarized as follows:

- (1) The use of raw materials of higher purity, notably lower alumina and alkali contents.

- (2) The production of bricks of higher bulk density. Silica bricks of 1.85 g per cc (116 lb per cu ft) are already being produced by some firms.

- (3) Consistent firing of silica bricks say to a specific gravity (average for 4 weeks) of less than 2.36.

- (4) Controlled heating up of furnaces, 24 hr being taken as the minimum safe time required to reach red heat (600°C) 1112°F.

- (5) The maintenance, by design and operation, of as much of the roof surface as possible, at a temperature approaching, but never exceeding, the maximum safe value (1650°C) 3002°F.

High Temperature Vacuum Furnace

A VACUUM furnace suitable for temperatures up to 3990°F has been built at the Chemical Institute at Uppsala, Sweden. In this design, described more fully in the **Engineers' Digest**, December 1947, p. 578, an alternating current of 200 to 500 amp is passed through a graphite tube which is split over the greater part of its length.

In order to minimize heat loss by radiation, a shield in the shape of a number of concentric cylinders is provided. The two innermost of these, which rest upon a bottom piece of graphite, are made of graphite and the annular space between them is filled with graphite powder, the latter being degassed under vacuum at 3630°F. The three outer concentric cylinders are made of sheet steel. At the top the resistor tube is covered with a refractory lid and a brass lid is provided in the top of the furnace. Both lids have a central hole. The crucibles are placed upon a

graphite stand and the melting process can be observed through a glass window in the top part of the furnace.

The furnace is evacuated through a tombac* tube of about 0.787 in. diam which is connected to an oil diffusion pump of 0.0023 cfm capacity.

** Copper-base alloys, with 70 to 92 pct Cu, remainder essentially zinc; tin optional up to 3 pct.*

There is also a rotary pump and a Gaede vacuum meter inserted in the line connecting the two pumps. The electric current is supplied by a 12-kw single-phase transformer with the following secondary taps: 12 v, 600 amp max; 24 v, 500 amp max; 36 v, 333 amp max; and 48 v, 250 amp max. No mention is made in the discussion of the degree of vacuum obtainable with this unit.



Fixtures Facilitate Automatic Buffing

The roller chain welded to the U shaped fixture base engages a horizontally positioned sprocket that advances the work under the wheel. The roller inside the fixture at right holds the chain in engagement with the sprocket. One fixture is loaded as the other two are advanced under the two exhausted buffing wheels.

STAINLESS steel moldings for automobile rear windows and windshields require buffing after forming. As thin gage stock is used, the formed molding must be supported on a stiff and rather heavy fixture that is difficult to handle in hand buffing operations. At best, hand buffing is tiring as considerable pressure against the wheel is required.

To handle this buffing operation automatically, Fisher Body's Ternstedt Div., at Columbus, Ohio, developed the fixture and buffing technique shown in the accompanying illustration. The moldings are buffed as the loaded fixtures move automatically under the wheels of conventional buffing machines on the flat top of a steel table constructed for this purpose.

For each shape of molding to be buffed, a set of three fixtures is provided. These are used in rotation, one being unloaded and reloaded while the other two are feeding, one under each of the two buffing wheels. Each wheel operates under its own exhaust hood and stick compound is fed to the wheel automatically. By exhausting each wheel, the table, the top of which is greased to promote free motion of the fixtures, remains relatively clean.

As one fixture feeds out from under the wheel, it is replaced by another that the operator has just loaded. Timing is such that, except for the short interval required to make each shift, there is always a fixture under each wheel.

Each fixture has a base made from angle iron bent to the U-shape of the molding. Supported above the base is a form over which the molding is placed and with which it makes a close fit. The lower edge of the base rests on the table and to the outer face of the angle is fastened a length of roller chain. This chain engages a sprocket behind the buffing wheel. This sprocket is turned about a fixed vertical axis by a shaft that is driven slowly by a gear reducer below the

table top. As the chain is welded to the angle iron frame, the latter is forced to move along and carry the fixture under the buffing wheel.

An idler roller, also turning about a vertical pivot above the table, bears against the inside vertical face of the fixture base, keeping the sprocket engaged with the chain. As motion of the fixture proceeds, the fixture turns the corners of the closed end of the U automatically at the same time sliding along the top of the table, as desired.

This fixture arrangement is such that the center of that area of molding being polished at any instant is always directly below the center of the buffing wheel, which rotates in a vertical plane. Consequently, the molding is polished much as it would be if the fixture were guided by hand, except that the fixture remains in a horizontal plane. At the end of the buffing, the fixture moves out from under the buff automatically and clears the wheel. Thus, no damage occurs if the operator is not ready to remove the fixture.

As the table supports the fixture and takes the downward pressure imposed by work passage under the buffing wheel, the pressure of the wheel against the work is constant for a given wheel setting. As buffs wear, the driving head is lowered, just as in most automatic buffing setups.

The rate of advance of the fixture and the work under the wheel is controlled by the rate at which the sprocket is set to turn, and this rate remains constant. Hence, all areas that contact the wheel are uniformly buffed. Buffing is under positive control, there is greater uniformity of finish than in hand buffing, and the rate of buffing is high. Deformation and wear of the buff enables it to conform to the convex surfaces of the molding.

A single operator keeps two wheels busy and does all the loading and unloading, thus sharply reducing the labor per finished piece. Physical fatigue is slight, fixture cost is moderate, and the whole arrangement is a definite advance over hand buffing.

New Production Ideas . . .

Internal grinders, horizontal broaching machines, a portable drill press, squaring shears, a die tryout press, a portable arc welder, a mechanical-drive turbine, and motor starters are reviewed this week. Pore gages, an air heater, hinged connectors, multi-jet nozzles, acid core solder, a cold paint stripper, and a pallet switcher are other new products described.

Internal Grinders

MINIMUM operator attention is required by the internal grinder, designed by *Bryant Chucking Grinder Co.*, Springfield, Vt. In



most cases, one or more machines can be operated by the same operator. The machine has a 16-in. swing inside the standard water guard and a 15-in. total wheel slide traverse. The swing is limited to 12 in. when grinding tapers greater than 15° included angle. It is generally suited for grinding work with bores up to 8-in. diam and the grinding traverse permits 6-in. bore lengths. For the smaller ranges of bores, Bryant high frequency wheel spindles operating up to 100,000 rpm may be used. A variety of standard or special tooling may be used in conjunction with the machine for particular needs. Bryant cylindrical slide construction assures rigidity. The cross feed is obtained by lateral motion of the work table. Machine movements are hydraulically actuated and controlled to afford flexibility of operation between the various units. Three methods of automatic sizing are provided.

plate bore, ways located above center line of broach, high speed individual return cylinder and a motor driven coolant pump furnished as standard equipment, are listed for a line of large horizontal hydraulic broaching machines now in production at *Acme Broach Corp.*, E. 3rd St., Lexington 47, Ky. These machines are built in 6, 10, 15 and 20-ton capacities with a 54-in. stroke, and are designed to handle broaches up to 60 in. long. Other features listed include easily adjusted sliding head, motor and hydraulic



pump located in accessible ventilated compartment, oil pump not submerged in oil, simplified hydraulic circuit with safety relief valve, built-in speed control valve for adjustment of cutting speed, and operating lever adjustable for height to suit operator.

Multiple Wheel Grinder

TO grind simultaneously several diameters on the same shaft, *Landis Tool Co.*, Waynesboro, Pa., has designed a new plain hydraulic grinder, designed as 10x30 in., Type CH-IW. Diameters being ground do not have to be straight, and provision has been made to profile dress the wheels so that tapers and other shapes can be finish ground. The maximum work swing is 10 in., maximum outside dimension across the grinding wheels is 30 in.; standard grinding wheel diameter is 36 in., and worn wheel size is 26 in. in diam. The

fender and wheel feed arm of the machine are pivoted at the rear so they can be swung out of normal position to remove worn wheels. Wheel dressing is by means of a table type diamond dresser. To



dress wheels to different diameters and shapes, the diamond bar follows profile bars mounted on the front of the bed. Wheel feeds are hydraulically operated, with a rapid feed advancing the wheel to grinding position and a slow feed moving the wheelbase during grinding. The headstock has four speeds ranging from 54 to 150 rpm, speed changes being made by shifting a V belt on a stepped pulley.

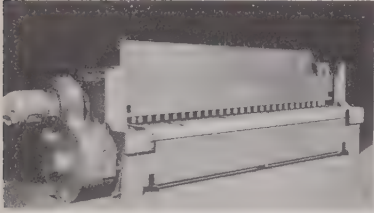
Squaring Shears

WITH a rated capacity of 5/8-in. mild steel 14 ft long, heavy duty underneath drive squaring shears have been completed by *Niagara Machine & Tool Works*, Buffalo 11. The machine has a rectangular box section bed and triangular box section cross head to give rigid support to the knives. This rigidity, together with the low slope of the upper knife, is said to reduce the tendency of sheared pieces to twist, curl or camber. The holddown, driven by eccentrics on the crankshaft, needs no auxiliary operating mechanism. Its self-contained, individually spring-loaded

Horizontal broaching Machines

FEATUES including tubular type steel cylinders, main pull-in cylinder in direct line with face

feet clamp the metal during the working part of the cycle and automatically compensate for variation in metal thickness. All rotating



parts are enclosed and operate in a bath of oil. A self-measuring back gage can be arranged either for manual or electric operation.

Small-Hole Tapping Machine

THE Model EO Cleveland lead screw tapping machine, manufactured by *Cleveland Tapping Machine Co.*, Hartville, Ohio, is designed to tap single holes up to 1/2 in. National Course Thread in mild steel or, with multiple heads, up to eight No. 6-32 or four 1/4-in. holes. This machine is powered by a 3/4-hp 1200 rpm high reversal motor with reversal capacity of 1650 strokes per hr. Either manual or automatic operation may be employed and indexing feeds, cross slides and hopper feed may be combined with automatic cycling to provide automatic operation. Tapping depth is said to be controlled to within 0.005 in., for blind hole tapping. Three optional spindle speed ranges are offered and coolant is provided through a centrifugal pump.

Portable Drill Press

REDESIGN of the Togglebug, a portable drill press, has been reported by *Guibert Steel Co.*, P.O.

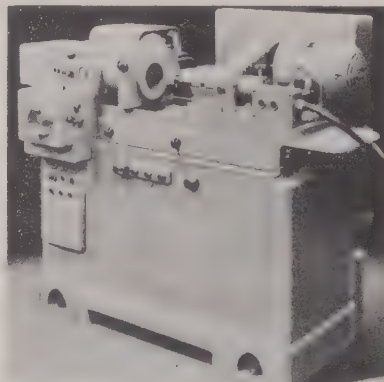


Box 1837, Pittsburgh 30. A standard model now provides four speed ranges and increased horsepower; another model is available with constant speed selected for average use. The machine can be made to

drill upward by changing two bolts in the handle. A reversible switch, required for up drilling, is provided. Frame, body and seat have been redesigned for better balance and comfort. This machine, which can be taken to the work, will do heavy duty drilling, reaming and countersinking on structural shapes or plate.

Internal Grinder

FOR small diameter internal grinding up to 2 in. ID, the Model 171 internal chuck type grinder has been added to the line manufactured by *Heald Machine Co.*, Worcester 6. This model is available with both Size-matic and Gage-matic features of automatic sizing. Controlled diminishing feed

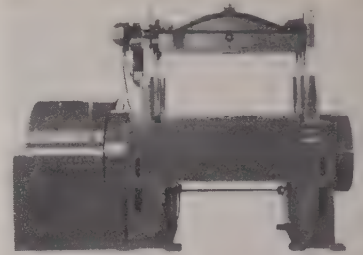


permits diminishing the amount of in-feed from roughing through finishing feed according to a preset rate, producing spark-out effect as size is approached. Faster cycles are afforded by operating levers including chuck release control, arranged for quick effortless operation. Quick, easy setups are facilitated by a single control knob which sets roughing and finishing cross feed cycle. Finger-tip action knobs control table speed, and table stroke is set by self-locking dogs. The workhead is set for straight or taper grinding.

Die Tryout Press

A 100-TON production type die tryout press now being manufactured by *Alpha Tool Works*, 9281 Freeland Ave., Detroit, operates at 60 strokes per min. The head lifts out of position by electric control and inverts so that both members of the die are readily accessible for finishing work without removing the die from the press. After finishing, the head returns electrically

to its original position. The machine has a stroke of 6 in.; maximum shut height of 16 in., minimum, 12 in. Clearance between col-



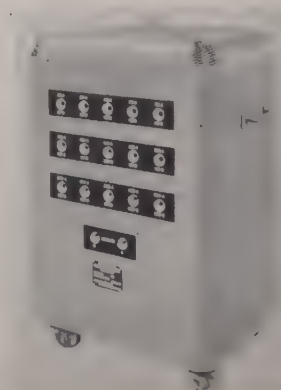
umns right to left, 44 in.; bolster plate measures 65 x 26 in.

Resistance Welding Holder

A LEAK-PROOF, ejector type, light duty welding holder has been made by *P. R. Mallory & Co., Inc.*, Indianapolis 6. The holder is designed so that the water circuit forces water against the head of the electrode tip regardless of length and the water circuit is sealed so that there is no leakage to create a rust problem on the work. An ejector plug facilitates tip removal and minimizes tip damage. The holder barrel is made of Mallory No. 3 metal, an alloy having high electrical conductivity and physical strength.

AC Arc Welder

ELIMINATION of moving parts in the redesigned Nu-Arc ac arc welder produced by *Electric Arc, Inc.*, Newark, N. J., increases

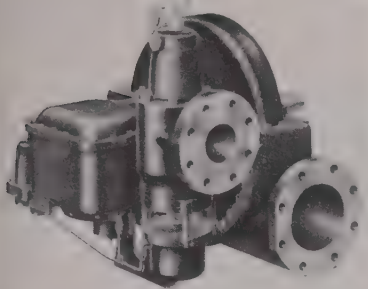


operating efficiency through its simplified construction. The portable welder is built for general-purpose use in welding shops, industrial plants, shipyards, and railroad yards. A complete welding service,

ready for immediate use, the welder is a plug-in type with multiple-stage heat ranges.

Small Turbine

A MECHANICAL-DRIVE turbine designated as Type DP, with ratings ranging from 10 to 1200 hp and speeds from 1000 to 5000 rpm, has been announced by



General Electric Co., Schenectady 5, N. Y. Type DP is available in three single-stage frame sizes with a 16, 20 and 25-in. wheel. Features of large turbines, such as hydraulic governing and pressure oiling of bearings, are claimed to make this turbine suitable as a drive for pumps, compressors, fans, blowers, and similar equipment. Range of speed adjustment has been increased to 30 pct and speed regulation has been reduced to 6 pct. A balanced valve design used for the governing and combined trip-throttle valves is said to require less force for valve operation and to permit a given size valve to handle larger steam flows.

Bronze Sheet

SHEET, strip and plate rolled from centrifugally cast aluminum-bronze slabs have been announced by *Ampco Metal, Inc.*, 1745 S. 38th St., Milwaukee 4. By centrifugally casting the slabs, the sheet rolled from it is sound, solid, flaw-free and uniform. Porosity, slag inclusions, pipes, striations and laminations are eliminated. This aluminum-bronze rolled sheet, plate and strip may be obtained annealed for fabrication purposes where corrosion-resistance is important, or unannealed and specially processed for applications where wear resistance is essential, such as gibs, ways and liners.

Special Live Centers

FIVE centers for tube turning have been announced by *Sturdimatic Tool Co.*, 5220 Third Ave.,

Detroit 2, in sizes 1 $\frac{1}{8}$, 2 $\frac{3}{8}$, 2 $\frac{3}{4}$ -in. diam. Characteristic of the design of Sturdimatic live centers is a low overhang and a slight cushioning action that compensates for expansion due to heat, shock and excessive thrust loads, said to reduce wear to a minimum. Large thrust bearing takes all thrust load, and large radial bearing takes only radial load.

Motor Starter

FOR protecting high voltage motor circuits against damage from short circuits, *Electric Controller & Mfg. Co.*, 2700 E. 79th St., Cleveland 4, has a new line of starters for use with 2300-4600 v motors. Known as Valimotor motor starters, they are designed for use, with safety, at any point on any power system regardless of the available kva. The bus may have infinite capacity. The Valimotor starter and motor may be connected out on the end of the line or right onto the generator bus. These new

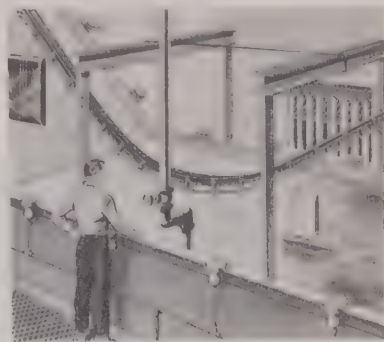


starters limit the maximum fault current that can be obtained on any system to approximately 25,000 kva. They are built to provide across-the-line starting, also in the reduced voltage starting style. 2300 v top ratings are 600 hp for 30 cycle systems and 300 hp for 25 cycle systems. On 4150 and 4600 v systems, top rating is 600 hp for 60 cycle service and 250 hp for 25 cycle operation.

Multi-Jet Nozzles

FOR smothering dip tank and drainboard flammable liquid fires with carbon dioxide gas, a new L type multi-jet nozzle has been developed by *Walter Kidde & Co.*,

40 E. 34th St., New York 16. The nozzle directs carbon dioxide in a fan-shaped blanket that hugs the liquid surface in tanks or along drainboards. It is equipped with a mounting flange for easy attachment to the top reinforcing angle with which most tanks are equipped. Depth of any nozzle from front to back is kept at a minimum



by the new design—4 $\frac{3}{8}$ in. for $\frac{1}{2}$ in. supply pipe—to permit installation of inlet piping close to tank sides. Because of the fan-shaped pattern of the discharge, more complete protection of liquid surface, or drainboards, can be achieved with fewer nozzles and less piping. The nozzle is also recommended for screening door openings with carbon dioxide gas.

Power Drive

A POWER drive for operating hand pipe cutters, threaders, and reamers, has been announced by *Ridge Tool Co.*, Elyria, Ohio. The new unit, named the Ridgid Porta-Power Drive, weighs 100 lb. It has a 3-jaw lathe-type scroll chuck in front and a self-centering workholder in rear which turns with the pipe. Additional features include a special chuck wrench ejector, a bump-proof start and stop switch, and permanent sealed-in lubrication. The drive plugs into any 110 ac line, and the motor is reversible. Capacity is from $\frac{1}{8}$ to 2-in. pipe and up to 8-in. pipe when used with the Ridgid universal drive shaft.

Acid Core Solder

A NEW acid core solder has been announced by *Alpha Metals, Inc.*, 363 Hudson Ave., Brooklyn 1, known as Alpha Tri-Core Leakproof acid-filled solder. This hard solder can be used to solder stainless steel, Monel, nickel and other metals hitherto not usually solderable with a core solder. The synthetic acid used

is more active as a flux than the zinc chloride, yet only half as corrosive. It is soluble in water. Another advantage is that a definite soldering sequence is automatically developed by three cores of flux, tending to eliminate cold solder joints. The three core construction promotes faster melting, and the increased melting speed results in stronger, more dependable bonds. Leakpruf tri-core solder is packaged in 1, 5, and 20-lb spools.

Bore Gage

RAPID, convenient and accurate measurement of small internal diameters is possible with the dial bore gage announced by Nilsson Gage Co., Lake St., Poughkeepsie, N. Y. This visible control inside-diameter indicator gage is light and



portable. The dial indicator reflects the size and condition of a hole and gives the inspector positive control over the size and shape of the bore. The dial indicator has graduations in 0.0001 in. with a total travel of about 0.008 in. Three gages will cover a range of $\frac{3}{8}$ to $\frac{7}{8}$ in.

Cold Paint Stripper

A COLD paint stripper developed by Allied Finishing Specialties Co., 2639 W. Grand Ave., Chicago, removes paints, lacquers, enamels, synthetics, varnishes and wrinkles almost instantly, requiring no neutralizing action other than a pressure water flushing or wiping with a rag. Refinishing can then proceed immediately, if desired. Marketed as "Electro," this stripper is primarily intended for dipping but may be applied either with brush or spray. The makers claim that the product is non-injurious when used as directed and that it will not

affect aluminum, copper, brass, magnesium, zinc, steel, cast iron or their alloys in the time required for removal of the paint film.

Air Heater

THE Midget Utility Air Heater, which includes fans, motor, drive, safety devices and temperature controller, has been announced



by Gas Appliance Service, Inc., 1211 Webster Ave., Chicago 14. The unit is direct fired and is recommended for heating drying rooms and small industrial ovens, used for baking varnish on coils, baking lacquers and enamels, curing rubber products, and drying of paint. Heating capacity is 125,000 Btu per hr and the heater is recommended for temperatures up to 350°F. The combustion chamber is brick-lined. Fan capacity is 1000 cu ft of air per min and hot air can be recirculated. Burner output and air volume can be regulated for progressive temperature control and air circulation.

Hinged Connectors

A ONE-PIECE, hinged connector, manufactured by O. Z. Electrical Mfg. Co., 262 Bond St., Brooklyn, replaces up to 32 different parallel or T connectors. Avail-

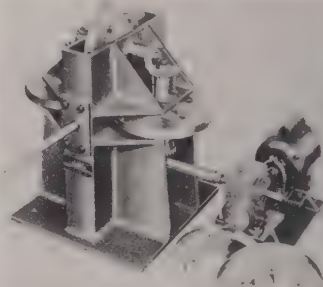


able in 25 sizes accommodating over 400 wire combinations ranging from No. 8 to 1,000,000 CM, the units will do practically all tap jobs. The connector can be permanently attached to the main and left for the tap to be attached later. One end is snapped over the main and tightened, the other has serrated

openings to which a tap can be run in three directions. Spring steel lock washers maintain permanent pressure. Grip holding serrations on wire-contact surface give maximum pull-out strength. The connector body, hinge and pressure plates are made of copped alloy.

Tube Marker

MANUFACTURERS of seamless and light-wall aluminum, copper and brass tubing are able to mark up to four sides of their products at production speed, according to Pannier Bros. Stamp Co., 206 Pannier Bldg., Pittsburgh 12, who have introduced an automatic marking device for this purpose. Known as the Master Marker, the device is said to stamp 1, 2, 3, or 4 sides on the same run at a rate



up to 300 fpm. It is designed to handle bars as well as tubing in round, square, hexagon and other shapes, in sizes from $\frac{3}{8}$ to 2-in. diam. The marker is equipped with a 1/3-hp motor and can be used as a portable or stationary unit for production or job work. Replaceable segments and interchangeable type are available. Weight of this marker is about 700 lb complete.

Pallet Switcher

A ROLLER platform truck has been designed by Lyon Raymond Corp., 4987 Madison St., Greene, N. Y., for loading pallets into freight cars or trucks and transferring them to roller conveyers for movement in warehouses. In transferring loaded pallets from the truck to the conveyer, one end of the roller platform is lined up with the end of the conveyer, and pallets are pushed onto the conveyer system. Specifications of this truck, when designed to handle the standard 48-in. pallets, include a double row of rollers on 2-in. centers. The top is 48 in. square and the truck is designed to handle loads up to 4000 lb.

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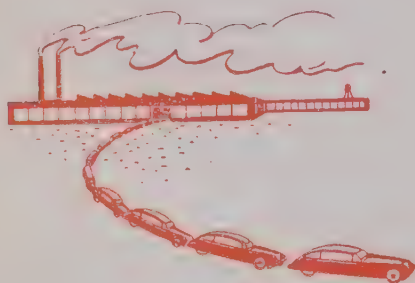


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THE IRON AGE, May 6, 1948—99

• UAW-CIO stunned by attempted assassination of Mr. Reuther . . . Big Steel wage pronouncement comes as bombshell . . . Chrysler negotiations head for a showdown . . . K-F boosts production at Willow Run.



DETROIT — Labor specialists in the auto industry frankly confessed this week their inability to interpret the bewildering criss-cross of events that have taken place on the labor front during the past 2 weeks.

The attempted assassination of Walter Reuther has stunned the UAW-CIO, leaving the union momentarily in a difficult position. For years Walter Reuther has controlled—when he has not dictated—UAW-CIO wage strategy. His ability to direct the situation from a hospital bed has yet to be demonstrated. As some sources see the situation, it was inevitable that some steam would escape from the UAW-CIO wage drive immediately following Mr. Reuther's hospitalization.

At the same time, labor analysts point out that UAW-CIO solidarity is probably stronger at the moment than at any time in the UAW-CIO's stormy history. This suggests the possibility that union bargainers entering wage negotiations will carry explicit instructions from their stricken leader which may have the effect of making them more militant than ever. Compromise may be even more difficult to achieve than it has been in the past, some sources believe.

A second event of the labor week—announcement that no wage in-

crease would be granted by U. S. Steel Corp.—came as a bombshell. Announcement of the position of U. S. Steel Corp. has had the effect of liquidating much of the talk in Detroit about 30 and 35¢ pay increases for auto workers. Most of the conversation now is for an 8-10¢ settlement—with 10¢ suggested as a ceiling. It is being pointed out that with Big Steel, GE and Westinghouse all resisting the union pay demands, 10¢ may well be the upper limit in pay boosts this year.

Some observers here have pointed out that nothing was said in the U. S. Steel announcement about union security proposals which are estimated to equal 9¢ per hr. These fringe issues it is understood are subjects for continuing negotiations between the union and the company.

* * *

WITH steel wage negotiations temporarily at a standstill and a stalemate existing in the electric industry, the negotiations between the union and Chrysler Corp. have moved into the labor spotlight. (IRON AGE, p. 102). At the moment both the union and the company are reported to have withdrawn their previous offers. Mean-

while, rumors have been flying that Chrysler is about to shut down for lack of steel. (GM began a company-wide shutdown this week attributed to a lack of adequate steel and pig iron supplies).

If a plant shutdown occurs Chrysler, the groundwork has been well prepared in advance. During March, Chrysler hit its peak for the postwar period, turning out 114,000 cars and trucks. At the moment Chrysler output is still booming along at an estimated 80 pct of plant capacity. In his recent report to Chrysler stockholders, K. Keller, president of Chrysler, said the coal strike has already caused a steady dwindling of work in progress in Chrysler shops and those of its suppliers.

Chrysler negotiators are reported to have injected a new argument into the wage discussions this week, pointing out that reduction in the amount of withholding taxes are equivalent to 4¢ per hr to auto workers. Hence, the company argues, take-home pay is increased by this amount. The union countered that the reduction in take-home pay for workers was insignificant compared with tax benefits that will be enjoyed by some of Chrysler officials. This is indicative of the level at which labor negotiations are often being carried on in the auto industry today.

* * *

Detroit Mourns Knudsen

Detroit

• • • The death last week of William S. Knudsen, former president of General Motors and director of war production, brought sorrow to Detroit and the nation.

The life of Mr. Knudsen is an inspiring one. He overcame the handicaps that faced a young immigrant and, through his mastery of the techniques of modern production and his executive capacity, moved to the top in the industrial world.

During the war he served as a lieutenant general in charge of the nation's war production. After the war he returned to industry in an advisory capacity. Prior to death, he suffered a lengthy illness.

This week negotiations between Briggs Mfg. Co. and the union went into its fourth week. Efforts by the union to take a strike vote last Sunday were not successful when it is reported that less than 200 of 16,000 workers showed up for a strike meeting at Cass Technical High School in Detroit.

In its publications the union has accused the company of "delaying tactics." A union spokesman claimed the company has not yet offered "one single concession." The union has also told its members that the company wanted the UAW-CIO to drop half its demands before the company would consider the remaining demands of the union. Similar statements have come from the company officials thus far.

Chrysler local unions have already taken strike votes which were won, according to union officials "with record majorities."

PROVED AGAIN AND AGAIN
the handiest machine
in the shop"

TWENTY YEARS AGO WE SAID

"Ten Men with 20 hands . . .

couldn't keep pace with either the output or the accuracy of this P&W Vertical Shaper." Twenty years ago the P&W Vertical Shaper was a shop sensation because it could machine much work usually done by hand. Today the Vertical Shaper is as accepted in toolrooms as a lathe . . . "couldn't imagine being without it". In principle it's still the same machine we introduced years ago, plus all the advancement in machine tool building that 20 years have produced. It machines those hard-to-reach surfaces, odd bosses and slots, relief angles . . . usually without setup changes or special tooling. Work is easy to mount . . . easy to index . . . to feed . . . to observe and control. Machinists like to use the Vertical Shaper to save their time — and your money. That's why everyone calls it "the handiest machine in the shop". Pratt & Whitney, Division Niles-Bement-Pond Company, West Hartford 1, Connecticut.

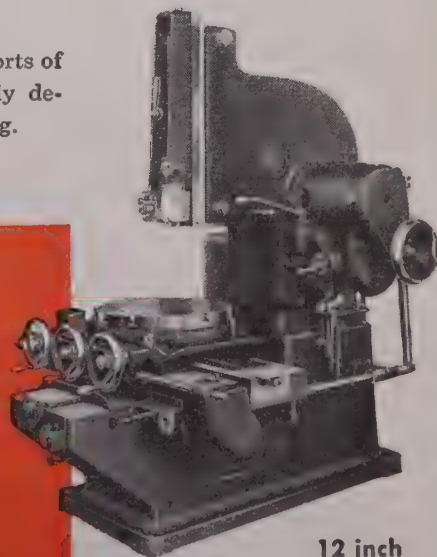
Ideal for machining jigs, fixtures, blanking dies and all sorts of irregular shapes, P&W's two Vertical Shapers are fully described in a 16-page booklet which is yours for the asking.

PRATT & WHITNEY

Vertical Shaper

6 inch

12 inch



12 inch

At the present time neither the union or Chrysler has applied much pressure to settle the wage issue. The next few weeks, however, should see a showdown. Most sources here believe this struggle could be the wage tug-of-war that may establish the pattern for the entire auto industry.

* * *

ADDITIONAL information about the Lincoln-Mercury 1949 models has been made available to IRON AGE.

The 1949 Mercury will be about 5 pct heavier than the predecessor model. The 1949 Lincoln will be 5 pct lighter than the 1948 Lincoln and the Cosmopolitan will be 5 pct heavier than the 1948 Lincoln. Detailed steel requirements are not yet available, a company spokesman said. (However, with the increase in glass area it seems hardly likely that the change in steel requirements will be significant.)

Specifications for the 1949 Mercury call for .110 in. steel for bumpers compared with .125 in. steel used in the 1948 model. The bumper steel for the 1940 Lincoln is .119 in. compared with .125 in. for the predecessor car.

The Mercury bumpers, front and rear, are one-piece, wrap-around construction. The Lincoln and Lincoln Cosmopolitan front bumper is three-piece construction, wrap-around design. The Lincoln rear bumper is one-piece, wrap-around

design with braces through the fenders for side impact strength. The Cosmopolitan rear bumper is three-piece wrap-around construction with fender braces.

Side rails and cross members are 12 gage steel (.1046). X-members are 13 gage (.0897). Rear cross members are 11 gage (.1196).

The convertible frame will be essentially the regular closed car frame with reinforcements, top and bottom.

No Lincoln or Mercury frames will be made at the Rouge. Murray Corp. in Detroit will supply the Mercury and Lincoln frame and Midland Steel Products Co. will make the Cosmopolitan frame, which is, incidentally, all-welded construction. In general, the 1949 frame weights are slightly heavier than the earlier models.

Lincoln-Mercury engineers have commented that separate frame and body construction is more flexible in their opinion than the integrated body-frame construction previously used. Such flexibility is desirable, it was explained, for the various body styles to be built in Detroit as well as branch plants.

Coil springs on the new cars will be made of SAE 9260 steel. The springs are shot-peened.

Lincoln-Mercury engineers have developed some interesting variations from the coil type springs used in other cars. The new Lincoln-Mercury suspension, for example, has a direct acting shock absorber, mounted inside the coil spring. It is claimed this makes the shock absorbers easier to service and does not require wheel realignment when shocks are replaced. The Lincoln-Mercury design uses a linkless sway-bar and camber and caster can be adjusted separately. The new design features an Elliot spindle whereas some of its competitors use reverse Elliott. The upper arm of the new Lincoln-Mercury suspension is made of pressed steel rather than forged.

Axle shafts for the new Lincoln-Mercury models will be SAE 1330H, SAE 5132H and SAE 8630H.

The 1948 Lincoln used a hypoid drive with $\frac{3}{4}$ floating axle; the 1948 Mercury used a spiral bevel gear drive with $\frac{3}{4}$ floating axle.

The 1949 cars use a carrier type hypoid rear axle assembly of semi-floating design which incorporates a two-pinion differential. The car-

Tucker Plans Output

Chicago

• • • Tucker Corp., Chicago, plans to produce ten Tucker cars immediately with 80 units to be added next month. Present plans call for shipment of 125 pilot cars to dealers. Present indications are that assembly line production will be started early in June. The Tucker engine will be produced in Syracuse, N. Y., at the plant purchased from Aircooled Motors, Inc.

rier provides sockets on both sides into which the axle tubes are pressed and key-welded. Tapered ax shafts are of one-piece design with upset ends. Ball wheel bearing sealed and lubricated for life, are pressed onto the axle shafts, eliminating shims and thrust block with taper roller bearings.

Lincoln-Mercury engineers explain that aluminum will replace steel in the new models to a small degree, depending somewhat on economic factors.

* * *

Weekly retail sales of Kaiser Frazer automobiles are now at the highest rate of the history of the company, according to a recent announcement. K-F is now operating 9 hr to increase daily car output above a schedule of 720 units. The demand for the company's product is such that cars are now being located to the 4000 K-F sales outlets, it was stated.

Gets New Post

Detroit

• • • J. L. McCloud has been appointed director of chemical engineering and chemical and metallurgical research at the Ford Rouge plant, succeeding the late R. H. McCarroll. F. C. Young has been appointed assistant director of the chemical engineering department.

McCloud is a graduate of the University of Michigan. He joined the Ford Motor as a chemist in 1915 at Highland Park and was later named chief chemist for Henry Ford & Son Tractor Co. In 1920 he was transferred to Dearborn engineering laboratories. In 1936 he moved to the chemical engineering department at the Rouge plant.

New Car Registrations

Detroit

• • • New passenger car registrations for March 1947 may reach 325,000, according to R. L. Polk & Co., statisticians for the automotive industry.

Total new car registrations for the year to date 100,000 greater than for the same period last year, Polk estimated.

New truck registrations continued to exceed 1947, Polk said. Early tabulations for March from states total 13,560 units compared with 11,869 from the same states a year ago.

It Pays to think of Steel Stampings



Radiator shell—one draw; 18 gauge;
4-1/2" deep, 24" wide, 30" high.

Motor cylinder head cover—one draw;
14 gauge; 5" deep, 6-1/2" wide,
9-1/2" long.



Oil pan—two draws; 16 gauge; 6"
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DON'T OVERLOOK possibilities of using steel stampings, with appreciable savings and other advantages. Often, it takes a specialized, high degree of skill to find best methods for producing complex parts. Long-experienced Transue designers have it. They've helped many users, large and small. T & W consulting service is at your disposal.

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• ERP appropriations considered in light of economic implications . . . Revised steel figures indicate 6 pct drain on U. S. production . . . NSRB encourages individual industrial mobilization planning.



WASHINGTON—The House Appropriations Committee, now considering the Administration's request for funds to finance the first 12 months of the European Recovery Program, has under study a report of the House Foreign Aid Committee, which warns the Economic Cooperation Administration that the U. S. must guard against "certain practices which will tend to defeat" the entire program.

The Appropriations Committee is considering the program as a whole in questioning government witnesses during hearings, rather than attempting any detailed breakdown of the program, and expects to conclude its deliberations by the end of this month.

In addition to the purely financial problems involved, the committee is considering many of the economic implications such as those outlined by the house foreign aid group.

Headed by Rep. Eaton, R., N. J., this latter committee points out that some European products such as steel are being exported to the U. S. and sold here at "very high prices" at a time when the U. S. steel industry is being called upon to export such products to Europe.

"Such practices will only result in useless cross hauls at a time

when transport is very short and in creating further inflationary pressures in the U. S.," the committee declares, adding that "a careful programming of additional facilities to prevent building up inefficient, duplicating, or excessive capacity will be a major responsibility of the administrator."

"If this country achieves its announced objective of a Europe which will be substantially self-supporting at the end of the reconstruction period, it must frankly face the probability that it will be helping to expand and modernize European industry which will compete with U. S. industry in world markets," the committee goes on to say.

"Special interests in this country will undoubtedly be directly affected by such competition and may, as a result, bring pressure to curtail further aid. However, as long as such European competition is not given special noneconomic privileges, there is little doubt but that the productive efficiency of U. S. private industry will be able to meet it successfully."

Meanwhile, revised Administration figures on steel exports to Western Europe indicate that the drain on U. S. steel supplies may not be as great as originally estimated.

IN discussing appropriations to carry on the program, Administration experts now estimate that maximum total exports of iron and steel products to Western Europe between now and June 30, 1949 will amount to 2,400,000 metric tons. This figure, covering total trade with Western Europe, will be comprised of 500,000 tons of crude and semifinished steel and 1,900,000 tons of finished steel.

These revised estimates closely parallel actual shipments of iron and steel to Western Europe during 1947. Exports of crude and semifinished steel averaged 87,000 tons per quarter during 1947 whereas under ERP an estimated 100,000 tons per quarter will be the maximum amount. In the case of finished steel the comparison is 134,800 tons exported against an

average anticipated quarterly export of 380,000 tons. It should be emphasized that current export shipments under export licensing procedures are considered part of the ERP totals.

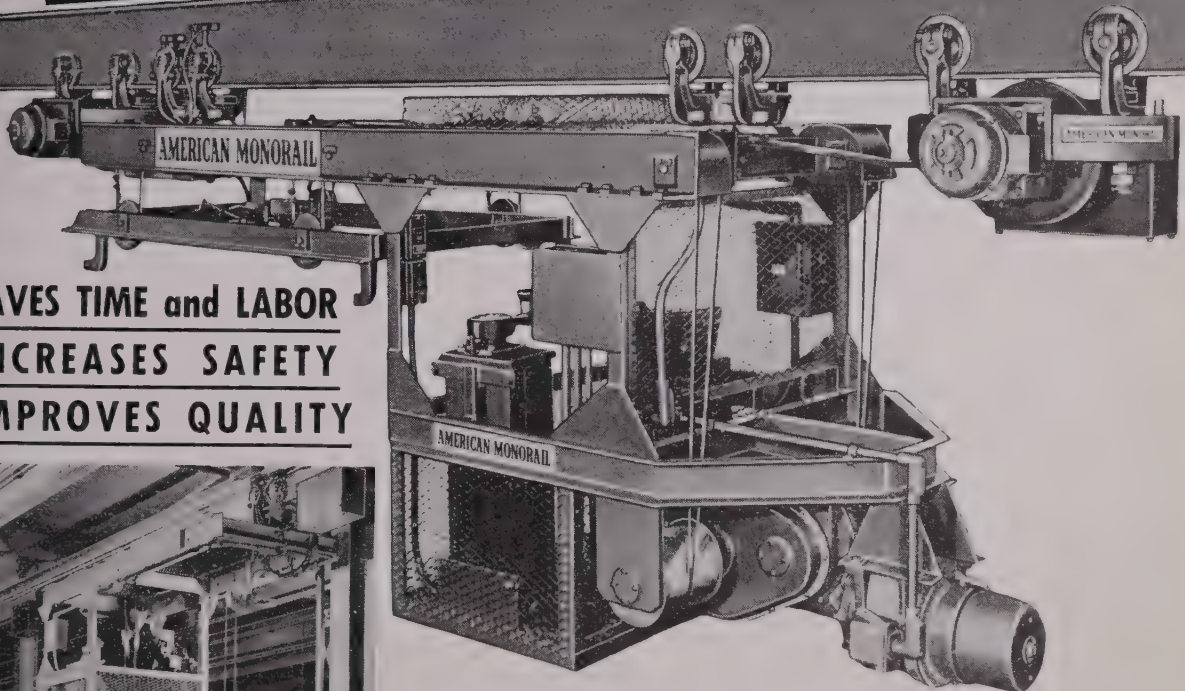
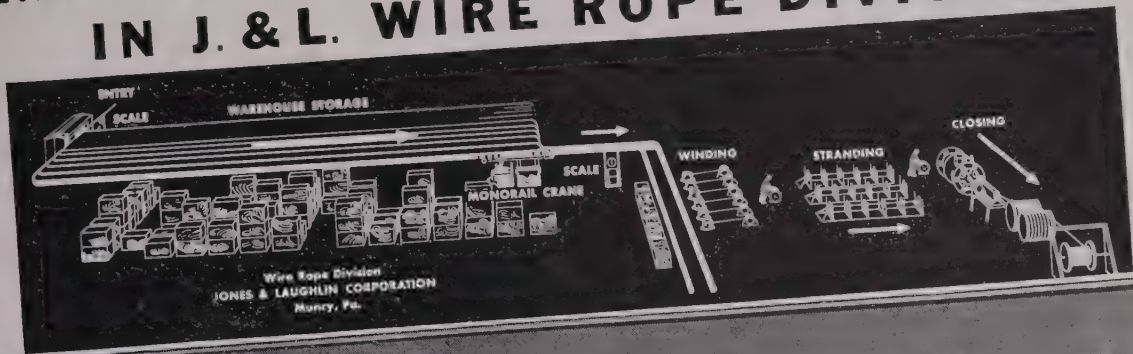
During this initial 15-month period it is estimated that the 10 countries participating in ERP will produce 39 million metric tons of finished steel. Consumption during this same period is estimated at 41,400,000 tons. The 2,400,000 tons proposed to be sent from the U. S., is, therefore, the measure of the anticipated shortfall in Western European production in terms of capacity to consumer. It is pointed out, however, "that this estimate is not a commitment and that it is quite possible that a lesser quantity may actually be needed to insure capacity operation of available steel consuming facilities in Western Europe."

In addition to iron and steel mill products as such the machinery and equipment to be supplied Western Europe during the first 15 months of the program is estimated to require perhaps 1,250,000 tons of finished steel in its production. The total impact of the anticipated shipments of iron and steel as such and of these materials in the form of machinery and equipment upon the domestic supply of finished steel may amount to as much as 3,600,000 or 3,700,000 metric tons during the initial period. In terms of total steel needed to carry out ERP this means that about 6 pct of anticipated domestic production must be considered potentially liable to shipment abroad for this purpose.

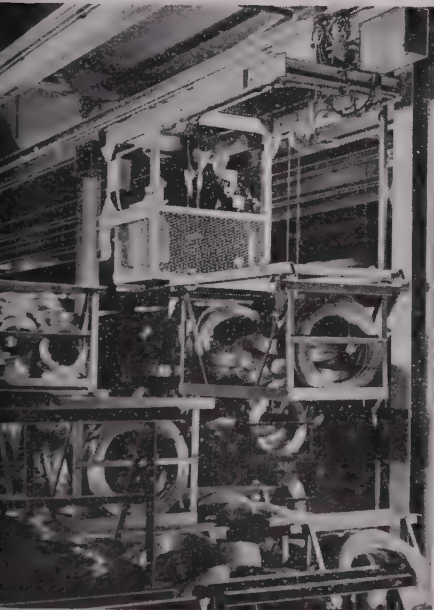
MOBILIZATION planning by individual plants and industries has been given a pat on the back by the National Security Resources Board, the nation's top mobilization agency.

Expecting to take 4 or 5 years to complete its overall industrial mobilization plan, NSRB has suddenly found it necessary to put such a plan on paper within a relatively short time. Faced with organizational problems, as well as difficulty in recruiting a competent staff from industry, NSRB officials told

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SAVES TIME and LABOR
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Operator of MonoTractor Carrier can deposit or select racks of wire at any spot in the warehouse.

A recently installed American MonoRail Overhead Handling System at the Wire Rope Division of Jones & Laughlin Steel Corporation not only saves time and labor, but also increases safety and improves quality of production.

All manual lifting of coils has been eliminated. Coils loaded in special racks are stacked three tiers high in the warehouse. Operator of MonoTractor Carrier has access to all racks for quick transfer of coils to the winding reels. Labor requirements for materials handling has been substantially reduced. Injuries from lifting have been almost eliminated. Stoppage caused by wire kinks and other damage when handled manually have been reduced by overhead handling.

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THE AMERICAN MONORAIL COMPANY

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THE IRON AGE, May 6, 1948—105

THE IRON AGE that "mobilization firms is strongly recommended." planning on the part of individual While NSRB has no pattern for individual plants to use as a guide post in such planning, it only asks that such individual plants be submitted to the board so that they can be worked into the overall plan.

"Pending a formulation of comprehensive blueprints," says Ralph Watkins, NSRB Program Director, "I believe the 'XYZ' company could profitably develop its own mobilization plans. Initially such plans may be limited to what may be known as 'resources balance sheets'. The balance sheet might include assets and liabilities expressed in terms of present and potential resources of facilities, equipment, manpower, power generating facilities, transportation, basic materials and possible substitutes, research facilities, transportation, basic materials and possible substitutes, research facilities, relations with subcontractors, etc. There would thus emerge an indication of deficiencies and the proper steps which the company might take to overcome such deficiencies. This would be more than a mere exercise. I suspect that presentation of this type of balance sheet will prove useful to peacetime

activities as well as to the nation in the event of war."

WHILE not many firms have taken the time to work out such plans, the idea is catching on. One major plan has been worked out by the Koppers Co., and is being studied by mobilization planning officials in Washington.

The primary objective of the Koppers plan is to determine the industrial potential of the company, plant by plant, division by division. The company is keeping such data up to date, and is prepared to furnish the information to the government promptly and accurately.

Koppers secondary objective is to afford management an opportunity to take stock of the plant equipment and processes and to look into the future for any products the company is making or can be equipped to make.

Typical of the information contained in the Koppers plan is detailed data on the following: Employee breakdown, details of World War II output, available facilities, principal products, raw material requirements, building layout, power sources, security measures, and labor relations.

FTC Issues Cease And Desist Order Against Refractories Indust

Washington

• • • Following by 3 days a Supreme Court decision which outlawed the basing point system used by cement manufacturers, the Federal Trade Commission issued a cease and desist order against major refractories manufacturers. It prohibits them from using "a planned system or formula which produces identical price quotation or prices."

The FTC order was entered against the American Refractory Institute, its members, and 37 specific corporations. This group makes and sells more than 75 per cent of the \$60 million to \$100 million worth of refractories annually. About half this output is consumed by the iron and steel and copper smelting industries.

See page 121-125 for other basing point news.—Ed.

It was held by the Commission that those named in the order had been a party to an agreement, determined through the Institute, to quote and sell special shape bricks at prices which, by adding extra charges, produced uniform matched prices.

Special shapes, as listed by the respondents, the FTC charged, included all sizes except the 9-inch standard and at one time amounted to 40,000 sizes.

Under the order, respondents are forbidden to enter into, continue or carry out a planned course of action which would tend to fix or maintain identical prices, terms or conditions of sale. Included among the specific trade practices prohibited under the order were: Quoting or selling at prices based on freight-equalization, price-delivered systems which prevent buyers "finding advantages in price"; compiling or using such compilations of extra charges for pricing special shape brick or tile; exchanging current or future price data which tends to enforce compliance with announced prices; compiling, exchanging or using freight rate factors in computing prices; establishing or maintaining delivered price zones; or quoting and selling on a delivered basis which includes phantom freight charges; prices which, in net f.o.b. terms, are higher to nearby customers than those more distant points; use of price leadership to produce uniform or matched prices; and use of any minimum resale price agreement which have been determined by or entered into between any two or more sellers.

However, the order emphasizes that the order does not prohibit any contracts or agreements relating to the maintenance of resale prices which are permitted under the Miller-Tydings Act.

THE BULL OF THE WOODS

BY J. R. WILLIAMS



A TAP

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ON PERFORMANCE



The value of a tap can be most accurately measured by the number of acceptable holes threaded before it has to be discarded. When Sheffield high speed taps are measured in this way, they win preference.

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"They run longer than any taps we've ever used."

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Sheffield's Principal Products Include Gages, Measuring Instruments, Machine Tools, Threading Tools and Contract Services. Standard Gages shipped within 24 hours.

• Local labor troubles harass Pacific Coast industries as wage adjustments "front" for possible issues of deeper significance.



SAN FRANCISCO—While the ruffled dove of labor peace has found at least a temporary roost in either the coal mines or steel plants of the nation, he would have but little chance to preen himself in safety on the West Coast.

Last week almost 30,000 men and women were kept from their jobs in metal working industries by strikes in Seattle, Portland and San Francisco. While in all cases the ostensible cause for friction has been wage rates, there are observers on both sides of the controversy who frankly state that there are reasons to believe union politics and possibly subversive elements have at least delayed settlement.

All production work at Boeing Airplane Co.'s Seattle division was halted at 12:30 a.m. Apr. 22 when 14,800 members of the Aeronautical Industrial Lodge (local 751) walked off the job in demand for a 30¢ an hr pay increase, paid holidays and the right to not change the existing seniority clause. While 3500 engineers, supervisors and office personnel stayed on the job, the strike stopped work on both military and commercial planes for which the company has a \$200 million backlog.

This strike, still not sanctioned by the International Assn. of Machinists, came about after more than a year of negotiations. In

May 1947, 5000 union members (the payroll then having 8450 union members) voted for a strike after rejecting a company offer of 10¢ an hr increase. This strike vote was not sanctioned according to the International as the existing contract stated it would run until a new one was reached by negotiation or arbitration.

This year union members voted for arbitration after rejecting the company's offer of 15¢ an hr across the board. A dispute developed after this vote between company and union officials on the matter of retroactive pay. The company wanted to place this matter before the arbitration board "pursuant to the contract" while union officials demanded an immediate agreement. Members of the union had no voice in the strike after this dispute, officials of the local and shop committee men being the only ones called in to vote.

While union pickets were supported by the Auto Mechanics, a sister union that called an 8-month-long strike last year, all other union labor organizations refused to recognize the picket line. AFL teamsters headed by Dave Beck were still reporting for work and truckers openly drove through the picket lines last week, and guards and firemen were also on duty.

Union and company spokesmen both agree that the strike has several elements which indicate a long period of work stoppage and civic leaders were concerned over the \$200,000 daily loss in payroll. Incidentally, it is estimated that one family out of every nine in the Seattle area is dependent on this payroll.

Boeing in Seattle is already being penalized by higher labor costs than similar plants throughout the United States and the 15¢ an hr increase being offered is believed by local observers to be the top that this operator can stand, because of the keen competition in other parts of the United States. Even this increase would raise the union payroll approximately \$5,600,000 a

year and would establish a rate higher than that of any other aircraft manufacturer in the country. Boeing recently signed an agreement with the Wichita, Kansas union for a 7½¢ an hr increase and even so the pay in the Kansas plant is still below that at Seattle.

As usually occurs in every labor crisis of major importance, there is talk of possibility of moving Boeing's operations completely to the Wichita area. In this case, there is even so the pay in the Kansas plant is as much as the Air Force, which is Boeing's best customer, would be in favor of such a move as it would get the production of the B-29 bomber away from the West Coast which is particularly vulnerable to attack from across the Pacific.

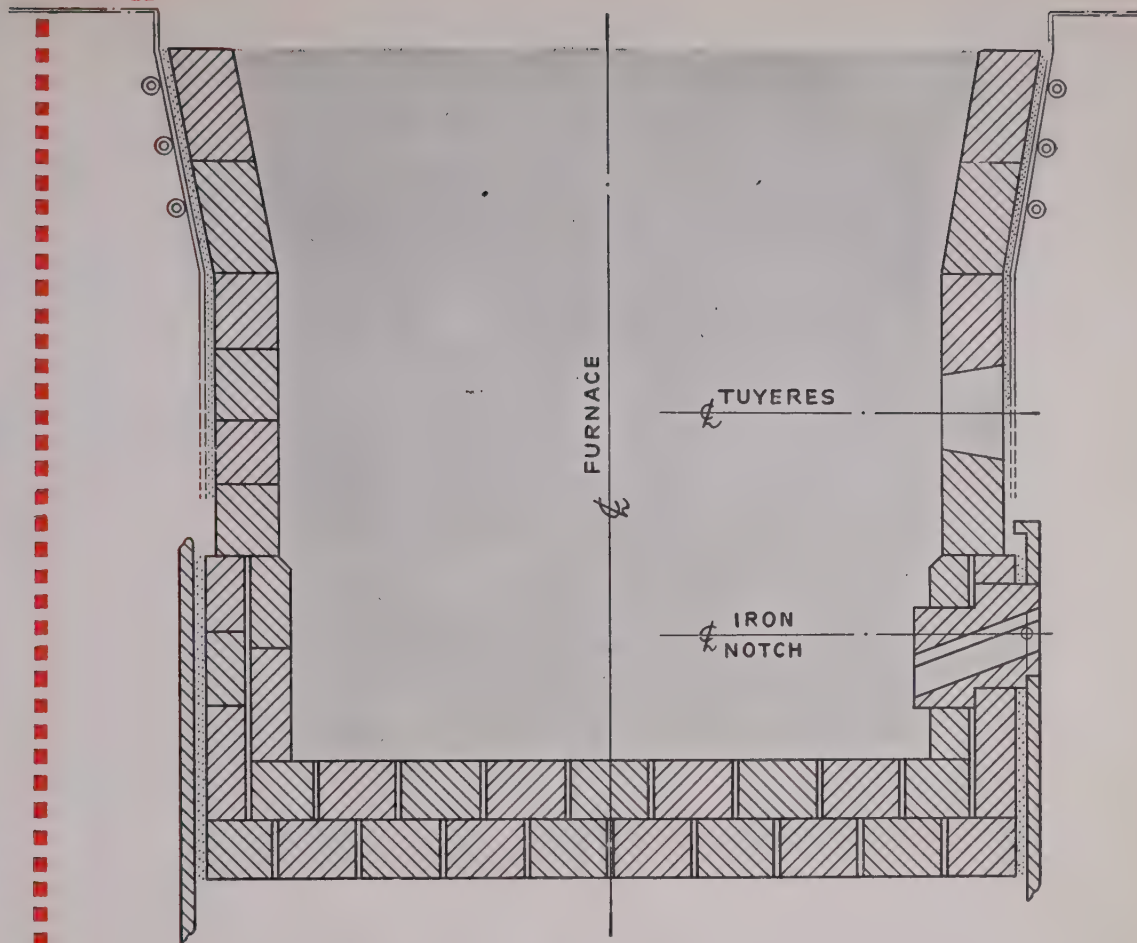
Another Seattle company which has been having its local labor troubles is the Sweden Freezer Co., which is now preparing to open a new plant for the production of ice cream freezers at Omaha. Officials of this company indicate the move was made to get the advantage of lower freight rates and lower labor rates. The local plant will continue in operation although plant officials consider the Omaha unit an ace in the hole in case labor rates local increase beyond competitive limitations.

SAN FRANCISCO machine shops and foundries have again been hit by a strike of International Assn. of Machinists which began the first week in April and last week had closed 80 plants employing approximately 5000 workers.

Even the plants which are still un-struck have been affected to the extent where many of them have reduced operating schedules to two days a week. Shortage of casting and machine parts are affecting production in many industries.

Both molders, affiliated with the AFL, and the machinists have demanded a 15¢ hourly increase while the California Metal Trades Assn. has offered the machinists 8¢ and the molders 7½¢.

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STEEL SCRAP IS
URGENTLY NEEDED.
BE SURE TO TURN
YOURS IN!

CIO machinists striking in the East Bay area recently rejected a 12¢ an hr wage increase which was then withdrawn by employers.

Approximately 35 foundries last week were closed tight in San Francisco as the AFL molders union resumed negotiations with employers.

Last year the International Assn. of Machinists staged a 4½-month strike which was finally settled by the wage increase of 15 pct and with an additional 3 pct in expanded holiday and vacation benefits. The length of that strike was attributed to internecine strife and was settled only after a shake-up of leadership. There are those among the employers who are inclined to believe that the present situation is not without some of the same element involved.

In Portland, 2000 AFL metal workers employed in 35 shops returned to work last week after they had won a 14½¢ an hr wage increase.

In the Salt Lake, Utah area all is temporarily quiet on the labor front, although the Progressive Miners union, anti-communist offshoot of the International Union of Mines, Mills and Smelters Workers, is making headway in its fight to pull locals out of the parent organization. It has now acquired eight locals, most of them small, and is making a stiff fight for others. It gained its first foothold in a Salt Lake Valley smelting industry recently by winning an election in a small clerical union at Garfield. George J. Wilde, head of the new union and former district president of IUMM & SW, has announced that the seceding local will meet soon to agree on demands for the upcoming negotiations for new contracts.

Leftist unions in the northwest were given a setback last week when Seattle local 232 of the United Automobile Workers and the Seattle Newspaper Guild voted to withdraw from the state CIO council with the objective of forming a new state CIO organization. Steel workers in Tacoma likewise voted to withdraw from the state organization and in Spokane 12 locals were reportedly taking the same step.

While each of these labor disturbances on the surface do not appear to have far reaching effects, competent observers believe that their duration and character por-

tends something more than worker dissatisfaction with wages.

LOS ANGELES—Benson Ford, vice-president of Ford Motor Co. and director of the company's Lincoln-Mercury division, will dedicate the Los Angeles Lincoln-Mercury assembling plant this week on its 34-acre site in the central manufacturing district.

The Los Angeles plant, 426,000 sq ft, is the first of three new Lincoln-Mercury assembly plants to be dedicated by Ford this year under its \$175 million expansion and decentralization program. It will be the normal source of supply for some 120 Lincoln-Mercury dealers in the Rocky Mountain and Pacific Coast states.

Employment in the new \$6,100,000 plant will be approximately 1500. Each 8-hour shift, 200 Lincoln and Mercury cars are scheduled to come off the assembly lines. Assembly

operations have been progressing for the past several weeks, and the Lincolns assembled here are the first to be produced outside Detroit.

The final assembly line is 680 ft long. Slat (floor type) and overhead monorail conveyors throughout the plant have a total length of 5 miles. Based on normal production of 200 units in an 8-hour day, there are 291 units in the system at any given moment, and the entire circuit from start to completion of assembly of a single unit requires 11½ hours. On completion of assembly, cars are tested on a ¼-mile oval test track on the plant grounds.

Parts storage and automobile assembly are housed in the main factory building, 840 x 300 ft, while additional buildings provide room for executive offices, showroom, garage, paint and oil storage, and boiler house. E. J. Bond will manage the new plant.

OIT Streamlines Its License System For Fast Export Action

Washington

• • • **Faster action** on export license applications is expected to result from a new procedure proposed by the Office of International Trade's Steel Exports Advisory Committee.

If approved by the Commerce Dept., steel exporters would be notified in advance concerning dates when licensing of each commodity for individual countries would take place. Exporters would then file license applications within the two weeks preceding the cut-off date.

The country quotas for each listed item would then be filled. The pay-off would be that immediately after the quota for a country was filled, all applications would be returned with proper notation—validated, rejected, or returned without action, as the case might be.

Those applications on which no action had been taken could then be resubmitted, either in original form or amended, for the succeeding quarter.

Preliminary to putting the new method into effect, OIT would return without action all non-validated applications for the current quarter. These could be resubmitted on receipt of notice that licensing would take place.

It was made clear at the meeting

of the advisory group on April 23 that exhaustion of quotas is the main reason for returning many applications without OIT action. Price factors constitute only a small portion of the rejections of non-action since this is considered when quotations are excessive.

End-use of a commodity, however, will still be given much weight in granting licenses. Also, proof of an order and acceptance will continue to be required.

New Dual-Fuel Diesel

Pittsburgh

• • • **Automatic accessories** controlled by push buttons now simplify operation of a dual-fuel diesel engine. The new model engine being made by The National Supply Co.'s Superior Engine Div., Springfield, Ohio. The company states that except for signal lights the engine gives no indication of fuel change even under full load.

The engine will run on any of a number of combustible gases, in addition to diesel fuel oil. The switch from the latter is made by a push button. When running on gas a little oil is injected to furnish ignition by compression. A governor takes over to increase fuel oil supply if gas supply falls off.

Dual-fuel engines are currently used in the oil fields and at power stations where gas, including waste from disposal plants is available.

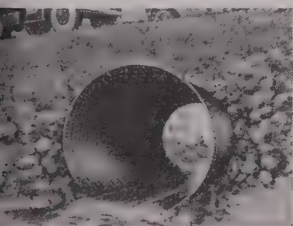
KONIK METAL

For Extra Durability

Rising construction costs have created increased interest in Continental KONIK—a better and longer lasting steel sheet for ducts and all heating and air-conditioning sheet-work.

KONIK, an open hearth alloy steel containing closely controlled proportions of copper, nickel and chromium, has greater strength and toughness . . . it provides extra resistance to rust and corrosion.

Commercial use of KONIK will open up new economies for those who use steel sheets. It withstands greater abuse in fabricating, causing fewer rejections. It solders and welds readily . . . its uniform zinc coating withstands difficult forming operations. Continental KONIK metal helps make better products . . . helps build sound repeat business. Call your jobber, or write Continental.



CULVERT PIPE



CHAIN LINK FENCE

Use KONIK Metal Wherever Resistance To Rust Is Important!

Continental KONIK has been proved under the most rugged conditions. It has proved its value over many years for culvert pipe in use under difficult and varying conditions. Continental Chain Link, the only fence made of KONIK, has provided property protection for industry, institutions and residences the country over. If your installations, inside or outside, call for galvanized sheets, you can depend on extra durability from KONIK metal.

*TRADEMARK REG. U.S. PAT. OFF.



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W. W. SEBALD, president, Armco Steel Corp.

PERSONALS

o o o

• **L. W. Beck** has been elected vice-president—sales, **D. J. Cummins**, vice-president—engineering, and **W. M. Harrison**, vice-president and treasurer of Cummins Engine Co., Inc., Columbus, Ind. Mr. Beck has been with the Cummins organization for 9 years, and has served as general sales manager since 1946. Mr. Cummins began his career with the company in 1919. Since 1947 he has been manager of engineering. Mr. Harrison, who was promoted from his former position of treasurer and controller, has been with Cummins since 1943, having held various positions in the sales, purchasing and control divisions of the company. **Carl R. Fox**, vice-president and works manager for several years, has been elected director. **W. J. Manning** has been elected assistant secretary and assistant treasurer and has been promoted to the position of controller from his former position of assistant controller.

• **E. W. Wilhelmy**, secretary-treasurer since 1938 of the American Welding & Mfg. Co., Warren, Ohio, has been elected to the newly-created post of vice-president of finance. **E. C. Fales**, vice-president in charge of operations, has been advanced to the post of executive vice-president, and **Henry H. Alden**, formerly assistant secretary-treasurer, has been named treasurer and assistant secretary. **C. I. Laraway**, comptroller of operations, has been made assistant treasurer.

• **W. R. Hough**, chief engineer since 1945, has been elected engineering vice-president of the Reliance Electric & Engineering Co., Cleveland.

• **David M. Griffith** has been appointed executive vice-president of the Wilputte Coke Oven Div., Allied Chemical & Dye Corp., New York. He has been associated with the Wilputte organization since its inception.

• **W. H. Rowand** has been named chief engineer of the Babcock & Wilcox Co., New York. He has been with Babcock & Wilcox for 19 years, and has served in many engineering capacities.



LOUIS M. HAGUE, president, Hanson-Van Winkle-Munnich Co.

• **Van Winkle Todd**, who previously served as president of the Hanson-Van Winkle-Munnich Co., Matawan, N. J., has been appointed chairman of the board of directors. **Guerin Todd**, former vice-president, has been appointed vice-chairman of the board. **Louis M. Hague**, former vice-president, has been named president of the company. **John A. Bauer**, former sales manager, has been made a vice-president, assuming many of the duties for which Mr. Hague was previously responsible. All of these officers have been with the company 20 years or more.

• **W. E. Falberg**, for the past 10 years head of special steel sales at the Cleveland plant of Joseph T. Ryerson & Son, Inc., has been appointed manager of alloy and stainless steel sales at the company's plant in Chicago. **E. H. Bodenmann**, formerly a sales representative of the stainless steel department of the Ryerson plant at Chicago, has been transferred to Cleveland, succeeding Mr. Falberg as manager of alloy and stainless steel sales.

• **O. G. Schwenk**, general production manager of the Weatherhead Co., Cleveland, has been appointed assistant to the president. **R. J. Finnegan** has been appointed to the position of general production manager, assuming the responsibilities formerly carried by Mr. Schwenk.

(CONTINUED ON PAGE 140)

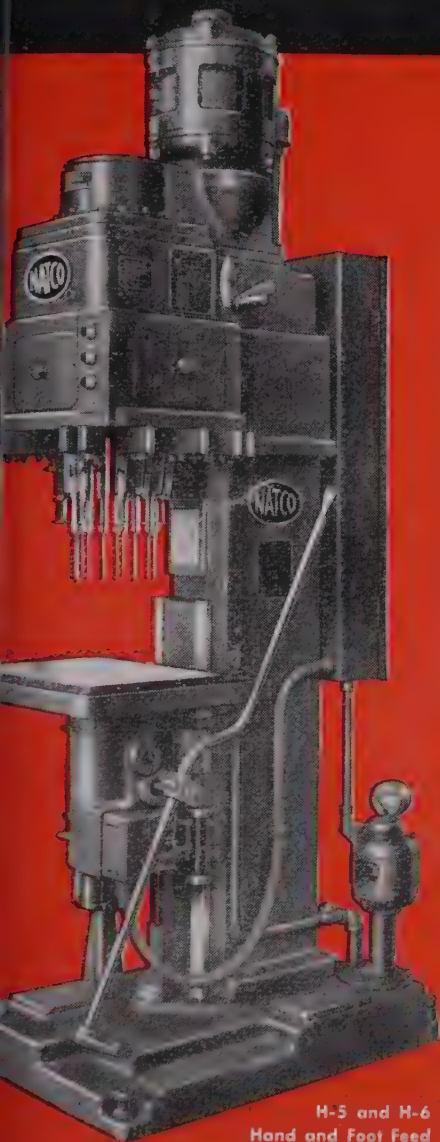
• **W. W. Sebald** has been elected president of the Armco Steel Corp., Middletown, Ohio, to succeed **Charles R. Hook**, who has been elected chairman of the board and will continue as chief executive officer. Mr. Hook had been president since 1930. Mr. Sebald joined the corporation in 1906. He was appointed assistant vice-president in 1923, elected vice-president in charge of commercial activities in 1926 and a director of the corporation in 1938, becoming executive vice-president in 1947.

• **C. E. Finney, Jr.** has been advanced to the presidency of the Salt Lake Refining Co. and the Salt Lake Pipe Line Co., both subsidiaries of Standard Oil Co. of California, San Francisco. Until recently Mr. Finney was a vice-president of Standard Oil Co. of California.

• **Stanley A. Brandenburg**, general sales manager of the Monarch Machine Tool Co., Sidney, Ohio, has been made sales vice-president of the company, and **Kermit T. Kuck**, chief engineer, has been named engineering vice-president. Mr. Brandenburg has been with Monarch since 1927; Mr. Kuck, since 1934.

• **Robert S. B. Holmes** has been appointed director of training and safety for National Tube Co., Pittsburgh. He had been assistant supervisor of education and training for Carnegie-Illinois Steel Corp.

H-5 and H-6 High Speed Multi Drillers and Tappers

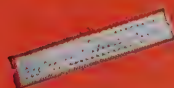


H-5 and H-6
Hand and Foot Feed

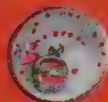
Available in Standard
or Heavy Duty Models
for work in small
or medium sized parts



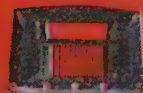
** In Cast Iron*



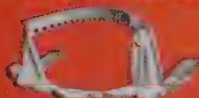
** In Wood*



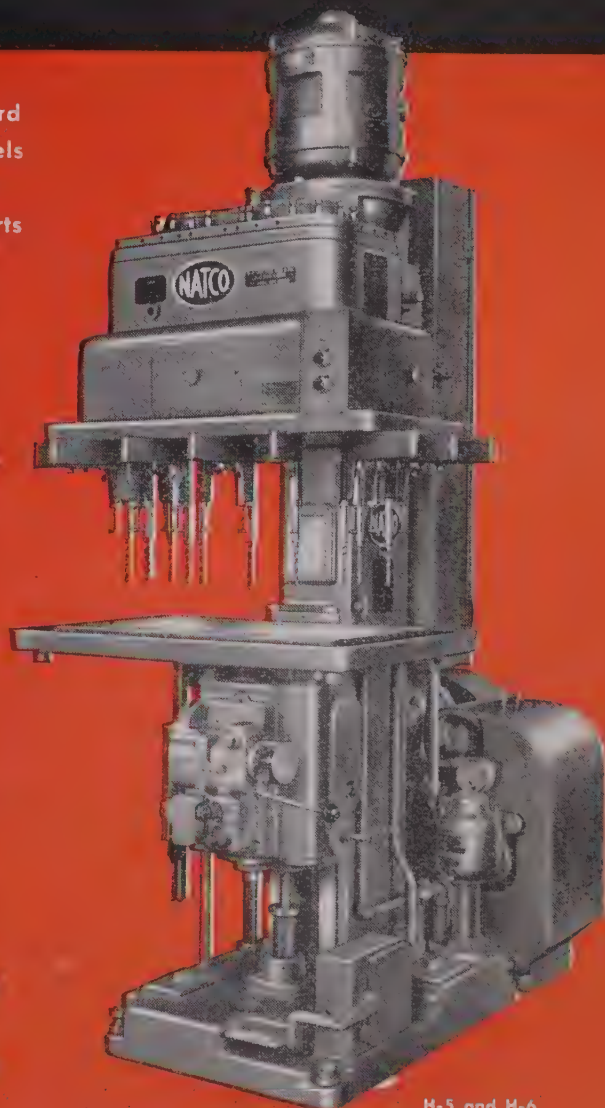
** In Steel*



** In Plastics*



** In Aluminum*



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• Preliminary steps in Germany towards currency reform . . . CDU-CSU oppose State control and centralized government, pledge to do away with planned economy . . . Americans firm on decentralized constitution.



LONDON—Frankfurt in spring 1948 conveys the sense of change. An end is at hand to the first postwar period, and new ideas, new measures are taking shape. The streets of the city reflect the characteristics of the Germany which is being re-formed. They show the generous wealth, the optimism, the natural, democratic individualism of America superimposed on a resentful, hysterical, corrupt and still ruthlessly egotistic people, living a life of ordered abnormality in ruins which nobody notices any longer.

The predominant influence of America is real. Though the British are equal partners at the top, the Americans hold the most important posts in the integrated Anglo-American bipartite administration for economic control. Since they bear the bulk of the financial burden, they have a majority voice in the body which controls Bizonia's foreign trade, the Joint Export-Import Agency. The SHAEF-type organization at Frankfurt is working well on the whole. Anglo-American integration is much easier than cooperation of any kind with the Germans.

The steps which are to be taken now that four-power rule has ceased to function in Berlin were forecast in part by General Robertson in Duesseldorf on Apr. 7. Financial re-

form will be carried out in the West, including the French Zone, and a government will be set up in Frankfurt, after agreement with the French. An Occupation Statute will limit the rights of Military Government.

The preliminary steps toward currency reform have been taken. A beginning has been made on the hard task of bringing German prices into line with each other and with world levels. The final details of the currency reform itself are now being settled with the Germans. New policies, freeing German foreign trade from much of the control of the Joint Export-Import Agency, are being considered; and some measures, notably the introduction of a single conversion rate for the mark (one mark equaling 30¢) have already been taken. Germany has entered the Marshall Plan, and the Germans have drawn up a statement of Bizonia's balance of payments. It shows an estimated deficit of \$1.2 billion to be covered by Marshall aid and U. S. appropriate funds. And, finally, American proposals to cut to the bone further dismantlement of German factories and to stop decartelization are now being discussed in high quarters.

Though none of these measures seem on the surface to be in opposition to a policy of State control, a trend in this direction underlies them, and the ideas which are being discussed in Frankfurt today.

AT present the movement toward free enterprise is obscured by the fact that the Anglo-American bipartite control authorities are at loggerheads with the chief German opponents of planned economy, the Christian-Democratic Union (CDU) and its counterpart, the Christian-Social Union (CSU). This party, the largest in the West, holds all the posts in the Bizonal Executive

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Committee, or "Cabinet," with one exception. It is largely responsible for the fiasco of the bizonal economic government, which was re-

formed at the beginning of the year, but has never properly functioned. Not a single law of consequence has been implemented. The central administrative body is still practically in the same state of paralysis as a year ago, although the Americans conceded it greater central powers than its completely impotent predecessor enjoyed.

The policy behind the delay in actions of the CDU-CSU is the party's determined opposition to State control and centralized government. More particular, it is looking after the interests of hoarders of hoarded goods, who are waiting for currency reform before selling their stocks. The Party recently publicly pledged itself to do away with planned economy "except where absolutely necessary."

The questions of State control and centralization are linked; and on both the views of the Americans and the German Right-wings are close. The Americans, who believe in their own system, stand firm on a decentralized constitution. They argue that, even if a planned economy were desirable, it could not work in a decentralized federation. Since the constitution will not be altered, it is necessary to alter the economic system. The individual States will not plan on a national scale; they are all too keen on their local plans. Therefore, the argument runs, the best thing is to hand over planning and distribution to the national industrial groups. This solution is one which is also supported by some influential British officials in Germany. Marshall aid and the coming abrogation of Anglo-American control will bring it to the fore. No German government will be competent to handle the vast number and quantities of goods which will be flowing into the country. Private industry and commerce must resume their proper place.

On this issue of State control and free market polemics rage between the Christian-Democrats and the Liberals on one side, and the Social Democrats on the other. The issue will certainly be fought in the general elections which must be held in a matter of months.



"take it" from Chief Keokuk...

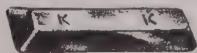
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Industrial News Summary...

- **U. S. Steel Cuts Widespread**
- **Details Surprise Other Firms**
- **Basing Point Arguments Rage**

THE depth and scope of the steel price cuts made last week by U. S. Steel were amazing to other steelmakers. On top of that move the Supreme Court ruling against the basing point system portended either financial ruin for some steel companies or an "anarchy" in selling if eventually the same ruling applies to steel.

Throughout these history making events, the steel consumer this week was the most confused. Within a few weeks he saw a possibility of his buying practices being radically changed; his prices reduced on many items but by different amounts and at the same time began to "pay the freight" because of the new railroad rates.

For the first time the steel user is finding so many steel prices for the same kind of product that it may be difficult for him to make any rhyme or reason out of his estimated manufacturing costs—if he can estimate. U. S. Steel's cuts have not all been met by other steel mills. Some steel firms have refused to reduce the price on items which were showing a loss or little profit. On others they have made deeper cuts and on others they have met competition.

Despite all this, the steel user will still have to choose his source on the basis of "where can I get the steel." The question of price with most steel consumers has been secondary since the war ended. It will continue to be as long as demand far outstrips supply. The European Recovery Plan and the U. S. defense program will prevent any early balancing of supply and demand in steel for many a moon.

THE steel price cuts by U. S. Steel were more numerous and deeper on some items than could have been imagined. They came as a shock to some other steel companies which had to study their own costs before making a similar move. In the face of increased freight costs on raw materials, the possibility of higher coal costs and perhaps the imposition of controls (which tend to increase costs) later, some steel officials believe that a steel price cut was not warranted.

If the attempt of all steel companies to strike a telling blow at inflation is not a success it will be a costly lesson for U. S. Steel and others which have gone along in the move. Steel men well know that the cost-of-living spiral is supported by higher costs to their workers for things not made by the steel industry. Their workers will not let them forget this.

Steel industry critics—Administration and Congressional—who appeared to take a sadistic delight in taking the industry apart only a month ago are strangely silent on steel's move to stop inflation in wages and prices—at a cost which many firms can not afford in view of balance sheets and reproduction costs.

It is a bitter pill for the steel industry to find Congressmen, who only a month ago wailed about a price increase, now talking about "watching to see that steel firms do not uniformly reduce prices." The tenuousness of the FTC charge against the steel industry indicates an amazing lack of understanding of practical producer and consumer problems.

Not a word has been raised about the steel consumer in the blasts about the basing point. Yet in interviews and surveys it has been clear that steel customers would be the ultimate loser in a strictly enforced elimination of multiple basing points. Neither the FTC nor any other government agency has yet offered any better plan for selling except academic "don'ts" and "can not do's."

STATEMENTS by some FTC officials that they do not call for a uniform f.o.b. mill price mean nothing. In normal times steel companies will have to meet each other's mill price if they want to stay in business. There is no immediate danger of serious dislocation in steel markets only because abnormal demand for steel is being fed by a defense program and a European Building Plan.

If the basing point system, which evolved on a trial and error basis over many years, is out for steel in a year or so fundamental changes in doing business will have to come. Steel users in mill towns will be in the clover. But steel users far from their sources will not be happy about their position. If they don't move they will have to pay their own freight while their competitors in the mill cities or areas will get their steel at an f.o.b. mill price. This will be agonizingly lower.

Steel firms clustered in areas with favorable assembly costs but lacking in steel customers will find it tough going to compete with other steel firms in large consumer areas. If they absorb the freight it will have to be on an individual or non-systematic way, *sic* FTC (whatever that means). But they will also probably have to make sure they give customers in their own backyard the same mill price charged to distant users.

It is all very confusing to steelmakers and their customers. But it will be more serious when and if the basing point ruling definitely applies to steel. So serious that steel officials shudder to think of what will happen. A possible out could be that Congress may favor legislation to legalize the basing point system rather than see a basic industry ripped to shreds because of a theory which looks good on paper but has never been tried except in court.

Steel output this week is up 5 points to 91.5 pct of capacity. It will take a few more weeks to approach the precoal strike level of 97 pct. Scrap markets were strong last week. A slight rise at Philadelphia moved the IRON AGE SCRAP composite up 9¢ a gross ton to \$40.42 a gross ton.

STEEL EARNINGS—Most large steel firms showed drop in first quarter earnings this year compared with a year ago. Higher costs due to the coal strike and the eight rate increase plus the price cutting will further reduce earnings for the second quarter.

U. S. STEEL—Net profit of \$33,957,341 has been announced for the first quarter of 1948. This compares to \$9,234,511 in the corresponding period a year ago and to \$9,397,811 in the fourth quarter 1947. Sales for the quarter amounted to \$556,002,239 against \$475,019,255 in the first months of 1947 and roughly \$595 million in the last 3 months of 1947. Production of ingots and castings averaged 5.1 pct of rated capacity for the quarter and shipments totaled 5,135,858 net tons, compared to 4,843,674 net tons in the same period last year and 5,359,763 net tons in the fourth quarter 1947.

BETHLEHEM—Net income for the first quarter of this year was reported at \$15,499,331. This compares with \$6,090,426 for the first quarter of 1947 and with \$12,377,647 for the fourth quarter 1947; 2,443,000 net tons were shipped, 46,000 more than in the first quarter last year but 51,000 tons less than in the preceding 3 month period. Net billings were \$295,576,646 as against \$237,525,443 in the identical period last year and \$288,347,947 in the fourth quarter 1947.

REPUBLIC—\$9,132,980 consolidated net income for the first quarter of 1948, amounting to approximately 5 pct on sales for the period, has been announced. Earnings for the same period in 1947 were slightly higher at \$11,516,795.

JONES & LAUGHLIN—Total sales for the quarter ending Mar. 31, 1948 are reported at \$97,531,525 and net income at \$5,150,704. These figures compare to \$78,263,438 sales and \$6,337,132 income for the first quarter of last year.

YOUNGSTOWN SHEET & TUBE—First quarter of 1948 net profit of \$6,423,566, compared to \$7,335,749 for the first quarter 1947, has been announced. Net sales and other revenue amounted to \$88,033,031.

CRUCIBLE—Net income for the first quarter 1948 was \$67,786 as against \$891,810 for the identical period last year.

• **INLAND**—Net sales for the quarter ended Mar. 31, 1948 amounted to \$90,527,112, an increase of about 29 pct over the same period last year. Net income amounted to \$8,458,544 compared to \$7,995,857 in the first quarter of 1947, and ingot production averaged 107.3 pct of rated capacity as against 99.4 pct for first quarter 1947.

• **PITTSBURGH STEEL**—Net income of \$900,310 has been announced for the first quarter 1948 compared to \$716,472 for the same period last year. These figures are on sales of \$22,219,467 for the period this year and \$18,348,789 in the same 1947 quarter.

• **ALLEGHENY LUDLUM**—\$1,307,471 net income for the period ended Mar. 31, 1948 has been reported, compared to \$1,826,609 for the first quarter 1947. Sales for the quarters were \$27,418,144 this year and \$24,105,492 in 1947.

• **WHEELING**—Net income of \$2,781,257 has been announced on sales of \$33,476,159 for the first quarter 1948. These figures compare with an income of \$2,948,268 on \$28,645,563 sales for the identical period last year.

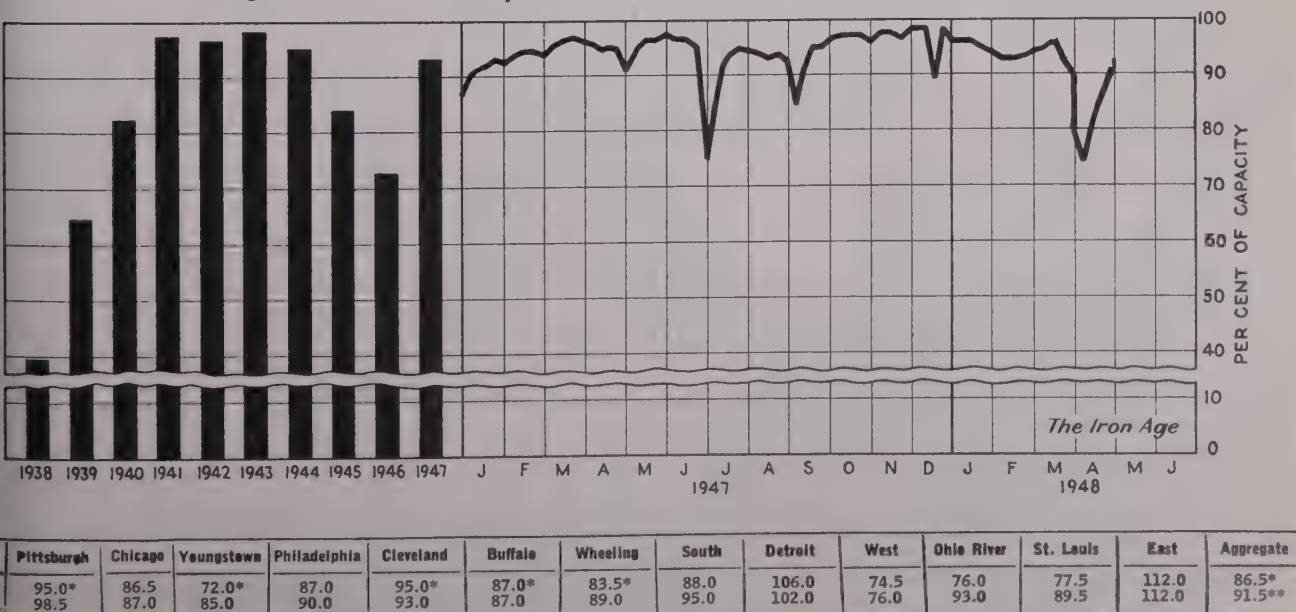
• **NATIONAL**—Net income for the first quarter 1948 was reported at \$8,661,760 compared to \$7,325,058 in the same period in 1947. Sales were highest in company history and 40-pct above first quarter of last year.

• **ARMCO**—Net earnings of \$5,867,347 for the first quarter have been announced. This compares with last year's for the same period when earnings were \$5,918,876.

• **ALAN WOOD**—1948 first quarter net income of \$672,110, compared to \$491,593 for the same period in 1947, has been announced. Total sales and operating revenue for the first 3 months this year were \$11,372,954 as against \$8,697,772 for last year's same period.

• **KEYSTONE STEEL & WIRE**—For the 3 months ended Mar. 31, 1948, third quarter in the company's fiscal year, a net profit of \$1,368,224 has been reported. This corresponds to a net of \$1,342,814 for the same period last year. For the 9 months, net profit is \$3,294,738. Total sales for the quarter were \$8,745,914 compared to \$7,488,905 last year.

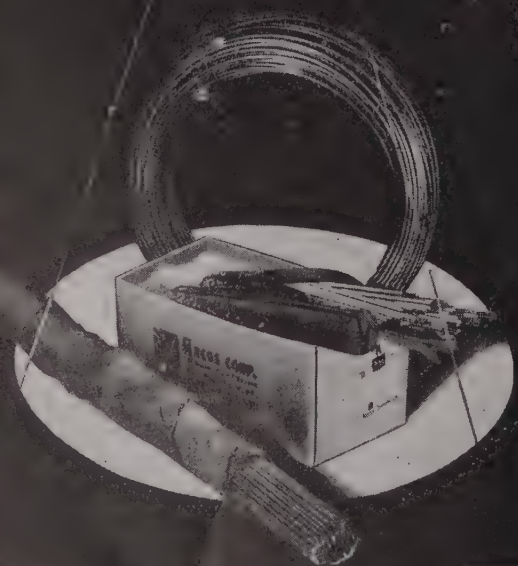
Steel Ingot Production by Districts and Per Cent of Capacity



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every respect, this
100 ton a day blast furnace
now owned by Lone Star Steel
tapping 700 tons a day with
capacity expected soon.

Houston

• • Despite the fact that Texas is a chemist's paradise, where it is possible to synthesize practically any organic material, iron and steel production is still a problem.

Sheffield Steel Co. and Lone Star Steel, the state's only producers of steel products and pig iron respectively, are high cost plants. Both companies, however, believe they can eventually cut costs and be competitive enough to survive when the hard test comes.

Lone Star does not try to dodge their present high selling price of iron. Their officials maintain they have a plant to pay for and that they found former customers to whom they sold iron at a cheaper price repeddled it at \$75 a ton anyway, and that if they are going to get the plant in the black and get it equipped to operate in a normal market, it must be done now.

Completed in 1942, the original Sheffield Steel Co. plant was added during the war. Today this fully integrated plant, capable of producing 50,000 net tons of ingots a month, is running wide open in an effort to meet a backyard demand. About 20 pct of the plant's total production of plates, bars, shapes

and merchant products are sold in the Dallas and Ft. Worth area, but the majority of the plant's output goes to steel hungry, ever expanding metal consumer plants in the Houston area and along the Gulf coast. Recently, Sheffield has sold plates to oil companies who ship them to Milwaukee for the making of line pipe.

In October 1945, Sheffield ceased operating the government owned portions of the plant. Since then the company has purchased two open-hearth furnaces and hot topping facilities both of which were DPC properties. Sheffield has under a 21 year lease with WAA the shell forging plant, plate mill building and blooming mill. This lease incorporates an option to buy.

Under a short term lease basis the company is also operating the government ore mines at Linden and Jacksonville, Tex. The blast furnace and coke ovens are also at present operating on a short term

Future of Texas Producers Hinges on Possibility Of Reducing Costs

o o o

By D. I. BROWN
Chicago Regional Editor

o o o

lease basis. At present the blast furnace, rated at 700 tons a day, is producing on the average 600 tons. Mexican ores make up 25 pct of the ore charge, with the balance split evenly between north and south basin Texas ores. Coal used by Sheffield is being brought in from Birmingham, New Mexico, Oklahoma and Arkansas mines. All raw materials are delivered to the plant by rail. Possible water transportation exists as the blast furnace and coke ovens are located on the Houston ship canal.

The recent hike in freight rates has increased steelmaking costs at Sheffield. Freight rate on coal from New Mexico at present is \$4.89 a net ton. Rates from Oklahoma and Arkansas have been raised from \$2.05 in 1945 to the present rate of \$2.54. Hauling costs on ore are also up. The rate on Durango, Mex., ore is now \$2.27, from Linden, Tex., \$2.00, and from Jacksonville, Tex., \$1.55. On the average this amounts to an 18.2 pct increase on all ore freight rates into Houston. Limestone secured from West Texas, which in 1945 cost 75¢ a ton to haul to Houston, now costs 87¢ a ton.

Prior to the war pig iron production at Sheffield was generally

Basing Points

• • • For news on basing point decision (Cement Case) see pp. 121, 123, 124.

FTC Regards Cement Decision As Ban To Basing Point System

Washington

• • The Federal Trade Commission this week moved to obtain quick compliance with its cease and desist order outlawing the multiple basing point system of pricing in the cement industry. The order issued by FTC in 1943 was upheld by the Supreme Court on Apr. 26, when the high tribunal overruled a lower court decision which nullified the original order.

In upholding FTC, the Court agreed in a 6-1 decision that a combination employing a multiple basing point system of pricing violated the FTC act and that such a combination results in "systematic price discriminations" which violate the Clayton Act.

FTC attorneys analyzing the effect of the Court's sweeping decision told THE IRON AGE that their interpretation is that basing point

See p. 123 for steel reaction to Cement case—Ed.

systems of pricing, single or multiple, are outlawed, as is "systematic" freight absorption. Much hinges on this word "systematic." The Commission interprets the Court's decision as permitting freight absorption by individual producers in order to meet competition, but not in a basing point or other "systematic" pattern. Therefore, random, sporadic, non-systematic, non-basing point, freight absorption on an individual basis appears to be o.k. However, FTC also states that the order makes it necessary for all cement producers to establish a mill price. Contrary to views expressed in some segments of the steel industry, the Commission does not now interpret the decision as forcing the adoption of a uniform f.o.b. mill system of pricing.

In a warning to other industries operating under similar pricing systems, the Commission has also gone on record as expressing "hope that industry in general and organized industry in particular, will avail itself of the opportunity now presented to conform voluntarily to the law as determined by the Supreme Court in the cement case."

Lynn C. Paulson, principal FTC

Doesn't Interpret a Forced Adoption of FOB Mill Pricing System

By GENE HARDY
Washington Editor

attorney in the Commission's steel case, told THE IRON AGE that one of the most important effects of the Court decision was that it "revitalized the authority of the Federal Trade Commission in determining what is unfair competition." In backing up his interpretation, Mr. Paulson points out that in all cases of fact the Court relied heavily on the FTC findings. For example, Mr. Paulson shows that many of the Court's conclusions are preceded by phrases such as the following: "We sustain the Commission's holding . . . In so doing we give great weight to the Commission's conclusion . . . We uphold the Commission's conclusion. . . ."

Along these lines, the Court states that it was the intention of Congress to create an agency "whose membership would at all times be experienced, so that its conclusions would be the result of an expertness coming from experience. We are persuaded that the Commission's long and close examination of the questions it here decided has provided it with precisely the experience that fits it for performance of its statutory duty."

Briefly, Mr. Paulson believes that

this will result in more and more cases brought by FTC being decided within the Commission rather than the courts. It also appears likely that the decision will result in faster action by the court.

In other important sections of the majority opinion, written by Justice Black, the Court ruled that FTC "has jurisdiction to declare that conduct tending to restrain trade is an unfair method of competition even though the selfsame conduct may also violate the Sherman Act."

In replying to two producers who claimed that FTC did not have jurisdiction on the grounds that they were not engaged in interstate commerce, the Court held that "The fact that one or two of the numerous participants in the combination happen to be selling only within the borders of a single state is not controlling in determining the scope of the Commission's jurisdiction. The important factor is that the concerted action of all of the parties to the combination is, essential in order to make wholly effective the restraint of commerce among the states. The Commission would be rendered helpless to stop unfair methods of competition in the form of interstate combinations and conspiracies if its jurisdiction could be defeated on a mere showing that each conspirator had carefully confined his illegal activities within the borders of a single state."

In discussing the historic belief that price competition is wholly unsuited to cement, the Court points out that this belief "has resulted in concerted activities to devise means and measures to do away with competition in the industry. Out of those activities came the multiple basing point delivered price system. Evidence shows it to be a handy instrument to bring about elimination of any kind of price competition."

As to individual guilt, the Court states that "each of the respondents, whether all its mills were basing points or not, sold some cement at prices determined by the basing point formula and governed by other base mills.

About Basing Points

New York

• • • Additional information on the basing point controversy can be found in THE IRON AGE, Aug. 21, 1947, p. 113. Other references include Jan. 1, 1948, p. 220, and the ABC of the Basing Point, Oct. 4, 1945, p. 121.

Industrial Briefs . . .

• **EASTERN AGENT**—G. S. Rogers & Co., Chicago processing materials firm, has appointed Ambrose McNamara, 11 W. 42nd St., New York, as eastern New York and New England states area representative of their specification products used in the heat treatment and finishing of metals.

• **ACQUISITION**—The Buffalo Pipe & Foundry Corp. has acquired the assets of the American Sigma Corp. of Buffalo, producers of bronze and brass castings and has established a nonferrous division.

• **MOVES**—The Independent Pneumatic Tool Co. has moved its executive and general offices from Chicago to their new administration building adjacent to the main works at Aurora, Ill.

• **MORE MEMBERS**—George M. Bendiksen, assistant treasurer and assistant controller of the Doehler-Jarvis Corp., New York, and Ralph Knapp, treasurer of the Precision Castings Co., Syracuse, have been elected to membership in the Controllers Institute of America.

• **SILVER JUBILEE**—The Morrison Products, Inc., Cleveland, manufacturers of metal stampings, blower wheels and drawn steel wheel guards, has recently celebrated its twenty-fifth anniversary.

• **TOOL DISTRIBUTOR**—Buffalo Forge Co. has announced the appointment of Eccles-Germain Machinery Co., 1910 Santa Fe Ave., Los Angeles, as distributor for the Los Angeles area.

• **AWARDED MEDAL**—The Priestley Medal, highest honor in American chemistry, has been awarded to Dr. Edward R. Weidlein, director of the Mellon Institute for Industrial Research, by the American Chemical Society.

• **RAILROAD CAR**—The opening of a \$2 million exposition on Chicago's lakefront sponsored by the leading railroads of the country has been set for July 20. The fair will dramatically reproduce the history of railroading since the first wood-burners right down to the Train of Tomorrow.

• **NAMES PRESIDENT**—Albert Sobey, for more than 20 years director of General Motors Institute at Flint, has been named president of the institute and a member of its board of regents.

• **MERGER**—The merger of Johnson Metal Products Co., Erie, Pa., as a division of Detroit Steel Products Co., has been announced. The present Johnson executive personnel will be retained.

• **MEXICAN PLANT**—The first aluminum foil plant in Mexico, at Tlalnepantla, a suburb of Mexico City, has been erected by Reynolds International de Mexico, S. A., at a cost of \$2½ million. The rolling of aluminum sheet and the fabrication of aluminum shapes is planned for the future.

• **PURCHASE**—Stewart Boiler Works, Worcester, has been purchased by a new company of the same name. Everett G. Fletcher is president of the new company and George W. Taylor treasurer.

• **NAMES CHAIRMAN**—Dr. Christopher E. Barthel, Jr., has been named chairman of physics research, Armour Research Foundation of Illinois Institute of Technology. Dr. Barthel succeeds Dr. Haldon A. Leedy who recently was appointed director of the foundation.

• **EXPANDS LAB**—Johnson Steel & Wire Co. has opened an enlarged laboratory at the Worcester plant with George E. Seeley in charge.

Congressional Prodding Brings Agency Action On Scrap Procurement

Washington

• • • Under prodding of Congressional criticism, government agencies are taking several steps to get inactive potential ferrous scrap supplies both at home and abroad moving into industrial channels.

In addition to setting up the new interdepartmental Scrap Committee under the Office of Industry Cooperation, plans have been made to dispatch a task force to Germany to get a million tons of scrap started flowing back to the United States immediately. Estimates of available German scrap range up to 1 million tons.

At the same time, General Marshall Arthur has been requested to survey and report on potential scrap located in the Pacific areas. Congress has been told that as much as 7 million tons are in Japan, plus another million in the Philippines. It is estimated by the Navy that 100,000 tons lie in the Marianas.

Government departments have been directed to submit monthly reports to the Commerce Dept. concerning estimated scrap and possible scrap held by them as well as totals of scrap released to industry each month.

Alex Miller, OIC scrap consultant, heads the group which will undertake to get scrap started from Germany. Other members of the group will include Maj. Gen. Orville R. Cook; Lt. Col. S. M. Poole; Isaiah Frank, State Dept.; Joseph J. Palmer, Office of International Trade, and Elliott S. Hanson, Office of Domestic Commerce.

Mr. Miller will also be the permanent head of the interdepartmental committee. Industry consultants include Edwin C. Barringer, executive vice president of the Institute of Iron and Steel Scrap, Inc., and L. D. Greene, of the Institute of foundry and scrap industry committee.

Other members of the governmental group are Rear Adm. Morton L. Ring, vice chief, Command Frank Roberts; Isaiah Frank of the State Dept.; J. C. Ten Eyck and Donald E. Kidson of WAA; Charles D. Marshall and James L. Pimp of the Maritime Commission; John Croston of the NSRB; Lt. Col. Poole of the Army, and H. B. McCoy and John L. Tappin, both of Commerce.

Chaos Seen If Multiple Basing Point Sales System Is Outlawed

Pittsburgh

• • If the multiple basing point system of steel marketing is outlawed steel customers face compound confusion and producers will be allowed to choose only between financial distress and anarchy. A bright spot in the picture is that prospects of the economic chaos that would follow a ban on multiple basing point marketing of steel and cigarettes, shoes and refrigerators—to name a fraction—may lead to corrective legislation from Congress.

Those, who look for Congressional action on multiple basing point marketing, point to a significant omission from the cement industry case: Nowhere is there any substantiated charge that the customer is being treated unfairly. They argue that if a selling system is to be declared unfair it must be found to be unfair to the customer. It is held that if the present system is fair to the consumer the Congress may decide against one that will obviously produce a host of consumer complaints. One purchasing agent put it this way: Is the FTC interested in protecting the consumer or in enforcing a theory?

Well informed sources agree that if the multiple basing point system of selling steel is outlawed by the Supreme Court it will be replaced by an f.o.b. mill method. How such a method would work in practice is not certain; there are two alternatives, both bad.

In the "Pittsburgh Plus" case in 1924 and again in 1939 the Federal Trade Commission declared in favor of a *uniform f.o.b. mill* method of steel marketing. This would require each steel producer to sell his products at prices quoted f.o.b. the mill. Prices would have to be uniform to all buyers no matter where they might be located. All transportation charges would be paid by the buyer.

The effect on consumers of such a system is obvious. Fabricators need only one mill would have to deal exclusively with that mill—again, if they could buy the sizes and types of steel required.

Those midway between mills would have the advantage of being able to choose a source of supply.

Change to an FOB Mill Basis Would Hurt Steelmakers And Their Customers

By GEORGE F. SULLIVAN
Pittsburgh Regional Editor

The Milwaukee stamper who could fill just half his needs in Chicago could turn to Cleveland, where by paying the freight to Milwaukee he might pick up another 25 pct of his needs. He might then fill the balance of his order in Pittsburgh, paying \$12.60 a ton in freight charges on this portion. He would never know his raw material costs in advance. If such a system became permanent many fabricators would find it smart to move their plants close to steel producing centers, thereby creating ghost towns all over the country.

Competition among steel producers is possible under the uniform f.o.b. mill system but often only at the expense of ruinous price cutting. If a Pittsburgh producer wanted to compete for structural

See p. 121 for Washington angle on Cement Case—Ed.

business in the New York market he would have to meet the Bethlehem-plus price. If shapes were selling at \$60 at Bethlehem and the freight to New York were \$5.00, the New York delivered price would be \$65.00. Freight from Pittsburgh would be about \$11.00. The New York delivered price, less freight from Pittsburgh, gives the Pittsburgh mill a net return of \$54.00 a ton.

Then, under this uniform f.o.b. mill system, the Pittsburgh mill could not charge any more than \$54.00 a ton, plus freight, to a fabricator anywhere else. If steel demand were high, the steelmaker wouldn't take a structural order to New York. If demand were poor and he were hungry for business, he'd wreck his whole price structure by taking the order. The answer would be for mills to concentrate on backyard selling exclusive-

ly. There has been a strong tendency in this direction, aggravated by rising freight rates, but it is neither universal nor permanent.

It appears that both the FTC and the Supreme Court recognize that freight absorption to meet competition should not be outlawed. This leads to the alternative to this uniform f.o.b. mill marketing system, an *f.o.b. mill* method with freight absorption (or equalization) in individual cases to meet specific competition.

But in the absence of a multiple basing point system it would appear that such competition would be illegal except in individual cases and provided it is not arrived at by any systematic method.

Many steel mills now use the freight rates that the American Iron & Steel Institute compiles from published official rates. This, FTC charges, clearly shows that a system is used in arriving at delivered steel prices.

The alternative, according to some steel sales executives who have been looking into the matter for many months, would be to throw out the AISI book as the FTC desires, and negotiate each sale on an individual basis. A must for every steel sales department would then be an accurate listing of every product made by any potential competitor with size ranges and specifications available at each of his plants.

To get orders it would be necessary for an army of salesmen to be constantly in touch with potential customers. The consumer purchasing agent would then tell steel company "A" that he had an offer from company "B" on ¾-in. condenser tubing at \$22 per 100 ft. Company "A" would check to see if the nearest mill of company "B" made ¾-in. condenser tube in the specification desired and whether its mill base of, say \$20, plus freight came to \$22. If the purchasing agent were found to be kidding the salesman and mill "B" didn't make ¾-in. tubing, the price would not be met if the freight were over \$2. If mill "B" did make that tubing, mill "A" would have to decide—for that specific case only—that it would absorb freight and

offer the equivalent product at \$22. This sort of competition, according to competent observers, would be perfectly legal.

But it is certain that the necessity of making an individual decision in each case—apparently no freight rate compilation could be used in an obvious manner—would be slow selling. It would also add

to steel selling costs. And the customer would never be certain that the purchase could be duplicated the following month. Today he can, barring price changes of which he is notified.

To say that many high steel officials are seriously worried over the implications of the cement industry decision overshadows the

concern which customers will show when the possibilities have been fully explored. Some well-informed observers believe that the cement industry case is too similar to the steel case to leave much room for hopes of a different outcome. They think that similar action against the steel producers will also be a decision against their customers.

Big Steel Consuming Points Would Become Bigger Steel Producers

Cleveland

• • • A new and nebulous era in steel distribution began to take tentative shape this week as the Supreme Court upheld the Federal Trade Commission's order in the cement case and ruled out the basing point system by a vote of 6 to 1.

While the best legal minds of the steel industry are poring over the 45-page decision and studiously refraining from comment at this juncture, indications are that the Supreme Court's decision means that any pricing system, including zone delivery, as in the case of conduit, that results in a uniform delivered price, is illegal.

Long range implications of the Supreme Court's decision appear sufficiently sombre at the moment to jar the foundations of the steel industry and change completely the geography of steel.

Steel consumers in non-producing areas will be drastically affected.

For the steel industry, first tremors of the decision will be felt in Pittsburgh, producing point supreme for more years than anybody can recall and which, of late, has been struggling desperately to hang on to its crown as the queen city of steel before the steady onslaught of Chicago. Too far east for most of the midwestern consumers at today's freight rates, and across the mountains from the eastern markets, Pittsburgh's capitulation, some predict, is inevitable.

It follows that to some extent the big consuming points will be the big producing points of the future, and thus the decision will have a salutary effect on new steel plant construction. Chicago looms as a likely spot for future expansion, but the coming shortage of iron ore in the Lake Superior district makes the construction of new facilities in

But Dislocated Areas Would Find It Tough Going If FTC Wins Point

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By BILL LLOYD

Cleveland Regional Editor

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the Great Lakes area a questionable move, in the opinion of some producers.

Detroit is another possibility, even with the cost of raw materials against it. The automobile industry is decentralizing, but it is still as big as ever in Detroit—it is simply growing elsewhere.

The decision also brings the U. S. Steel Corp.'s Atlantic Coast plant plans, presumably in the Chesapeake Bay area, into sharp focus, with foreign ore and foreign markets.

Steel consumers who are producers of products with a high steel raw material cost will be in a jam, particularly those located in California, Texas, Kansas, Iowa and other dislocated areas.

Consumers in the river towns, St. Louis, Louisville, etc., will also be hard put to pay the freight haul and still meet competition from producing areas. St. Louis conceivably could be saved, however, if the Granite City basing point prices were higher.

Contrary to a popular misconception, the FTC order, which will be the cause of this industrial carnage, is not aimed at uniform basing point prices, but at more basing points.

Undoubtedly terrific political pressure will be brought against the decision, which among other

things is certainly a block against the decentralization of industry.

The FTC order does not require uniform f.o.b. mill prices. In fact the FTC order would allow a cement producer, for example, to quote a higher price to a remote consumer but not by such an amount as to be uniform with other producers. A requirement of a uniform f.o.b. quotation is one thing; uniform delivered prices are something else again).

All this leads to the inescapable conclusion that there will be no more basing point prices. The FTC is not out to make uniform f.o.b. mill prices the law of the land, but is after a system which will not leave a consumer in a distant consuming point with identical prices.

K-F Sells Rolling Mill

Detroit

• • • Kaiser-Frazer executives apparently feel it is more important to add 300,000 tons of pig iron to the nation's supply than to operate a 55,000-ton finishing mill.

This is one interpretation of K-F's recent move to sell its Indianapolis Rolling Mill Div. simultaneously with the announcement that K-F will blow in its Ironston blast furnace at Provo, Utah, within the next 2 weeks.

The Indiana mill has been sold to a group previously identified with Phoenix-Appollo Steel Co. and headed by Victor Nemeroff, president of Electro Mfg. Corp.

Explaining the move, Clay P. Bedford, vice-president in charge of manufacturing, disclosed that "Kaiser-Frazer's basic steel outlook has improved greatly in the last 90 days as a result of the acquisition of the Ironston blast furnace at Provo, Utah."

Petroleum Industry Steel Requirements Are 16 Million Tons

Washington

• • Officials of the Office of Industry Cooperation this week discussed with the Steel Products Advisory Committee iron and steel requirements for the petroleum and housing industries under the voluntary allocations program.

Petroleum industry requirements presented to OIC by Interior Secretary Krug last week amount to 3,199,264 tons for the 18-month period ending Sept. 30, 1949. On an annual basis this amounts to 2,779,509 tons. The 18-month total is broken down as follows: production, 4,429,774 tons; transportation, 2,416,552 tons; refining, 1,505,08 tons; marketing (other than liquified petroleum gas), 2,851,119 tons; marketing liquified petroleum gas, 1,055,169 tons; natural gas gathering and transmission, 2,217,00 tons; and foreign, 1,723,642.

The Interior report emphasized the industry needs for steel for production purposes, rather than marketing—if these requirements are to be cut substantially, as indicated by OIC officials.

Steel requirements for housing purposes are roughly estimated at about 2 million tons. Pig iron requirements as yet have not been worked out.

Texas Steel Production

(CONTINUED FROM PAGE 120)

are available from the wire mill facilities at Houston. The nail mill makes everything from brads, 1/2 in. long to 12 in. long spikes 3/8 in. diam. Fence making, welded mesh and fabric machines complete the merchant products available off the mill's facilities. The former DPC shell forging plant located on the Houston site is now being used to stamp out tank heads and similar products for direct sale to fabricators and users in the area.

Considerable interest in the possibilities of Lone Star Steel becoming a steel producer is evident in the southwest. Industrialists in Houston do not believe this plant will survive. In east Texas, such statements just aren't made. Those who don't care about steel production are nevertheless watching Lone Star's progress on ore beneficiation. This process will eventually have

to be used in many fields, except taconite ores instead of siderite and limonite will be the raw material.

On the premise that a blast furnace in Texas was necessary during the war and that such an operation will eventually be proved economically feasible, the Lone Star Steel Co.'s operation at Daingerfield appears to be a well chosen site. The total area of ore land available is 32,070 acres. In this area 2476 acres have been test pitted and reserve blocked out.

Ore is now being mined from an open pit 1 1/2 miles from the beneficiation plant. This pit, about 20 acres in area, has yielded well over a million tons of crude ore. The first iron ever produced in the state was made there in 1860—for Confederate Army cannonballs—which Union officers claimed were of prime quality in every respect.

Considering the ore deposits, neglecting historical precedent, the present site was a natural for another reason—water. The plant today pumps 10 million gal of water every 8 hr from an 1800 acre artificial lake.

Few other areas offer the type of topography needed to create a stockpile of this all important basic material used in iron making. No other area had large ore deposits with the necessary water potential so handy, hence Daingerfield.

Lone Star Steel is as yet the only iron producer in the country operating on practically 100 pct beneficiated ore. With dire predictions concerning the eventual depletion of the naturally rich Lake Superior ore, the company may be considered far ahead of the industry in this respect. Other pig iron producers claim Lone Star is far ahead of the industry in price too. Despite the fact that plant officials believe they will eventually be competitive in price with Birmingham iron, there aren't enough iron consumers with high enough tonnage requirements

in the immediate area to support the plant.

Pig iron consumption for the area, however, has increased many times since prewar. In 1939 Texas consumed 2297 gross tons. Louisiana, Arkansas and Oklahoma combined used 1788 gross tons. Last year preliminary estimates by U. S. Bureau of Mines indicate Texas used 21,671 gross tons, the other three states consuming about 3700 gross tons.

At present the bulk of the iron is not consumed in the area. Lone Star is shipping all over the country. Detroit's auto makers are big customers. Beginning in June, malleable iron production will begin at Daingerfield. Lone Star Steel's salvation, it appears, lies in eventual making of steel. The plant was originally laid out to include steel-making and rolling equipment but the iron making facilities were installed first.

So far the Lone Star officials must concentrate on making the only products they are capable of producing and paying off the \$7 1/2 million investment made in the DPC property. Products sold beside coke and No. 2 foundry iron ore, iron ore, by-products, slag and power. The plant generates more power than it uses and sells this surplus to utility companies.

With \$1 1/2 million down and the balance to be paid in 10 years in equal quarterly payments, plus 4 pct interest, steelmaking expansion on a large scale at the moment is not thought likely. Rehabilitation so far has cost the Lone Star Steel Co. another \$1 1/2 million with \$2 million to be spent in the next 12 to 18 months. Since its inception the company has paid no dividends but has plowed back all profits into the corporation. There are a total of 3400 stockholders, all located in Texas, many of which are small farmers, oil men, etc., who are willing to back business in their state.

COMPARISON OF PRESENT STEEL CAPACITY OF SHEFFIELD STEEL
OF TEXAS WITH ORIGINAL CAPACITY

Annual — Net Tons

	Original Plant 203,000	Wartime 507,000	Present 600,000
Ingot Capacity			
Individual Product Capacities			
Wire	30,000	30,000	75,000
Plates	60,000	276,000	180,000
Structurals	100,000	100,000	120,000
Bars	120,000	120,000	200,000
	310,000	526,000	575,000

Geneva Steel Drops Price Differentials in Basic Market Move

Salt Lake City

• • • On May 1, 1948, base prices at Geneva, Utah, for steel products produced there by Geneva Steel Co., subsidiary of U. S. Steel Corp., became identical with the base prices for similar products at the plants of subsidiaries of U. S. Steel at Pittsburgh, Chicago, Gary and Birmingham, Benjamin F. Fairless, president, said last week.

"For the first time in the history of the steel industry, a Western mill has announced prices at a parity with those for similar products produced by steel mills in the East. To attain this parity in base prices was one of our aims when we purchased the Geneva Plant from the Government in June, 1946," Mr. Fairless said.

The elimination of the Geneva differential recalls the corporation's move in June 1938, when it suddenly abandoned a steel price differential between Pittsburgh, Birmingham and Chicago.

U. S. Steel has lost no time in passing on to its Western customers the benefits of lower steel costs obtained at Geneva steel under the leadership of Walther Mathesius, president of the subsidiary, who is an old hand at cost reduction.

It is expected that when Geneva starts making light flat rolled items they too will be on a parity with flat rolled steel prices in the East. The price move makes the firm extremely competitive on the West Coast. It is looked upon as a strong bid for more of the Far West business.

Bethlehem Joins Fight

New York

• • • Bethlehem Steel Co. expects this week to complete its study of what steel prices to reduce and how much. Next to U. S. Steel Bethlehem is the largest steel producer. The list of products it makes is prodigious.

According to Eugene Grace, chairman of the firm, the total savings to its customers will be \$10 million on an annual basis. Some products are being made at a loss, Mr. Grace said.

The chairman warned that the freight rate increase will cost Bethlehem \$4 to \$5 million dollars a year. Referring to the tightness of coal supplies Mr. Grace added: "There should not be any further increase in the cost of coal or fuel in general. We can't stand increases in costs anywhere and maintain present prices."

Seeing "an indefinite capacity demand for steel," Mr. Grace added, "There is no falling off in domestic demand. Future tightness depends on the foreign aid program and no one seems to know the tonnages involved."

Details on Steel Prices

New York

• • • The following U. S. Steel prices include switching charges. To get an f.o.b. mill price per lb subtract .06¢ for Pittsburgh and Chicago; .05¢ for Cleveland; .033¢ for Youngstown; .0375¢ for Birmingham and .025¢ for Geneva, Utah.

Carnegie-Illinois Steel Corp. announced the following reduced de-

livered prices at Pittsburgh, Chicago, Gary and Youngstown for car load lots effective May 1.

F.O.B. CARS DELIVERED WITHIN SWITCHING LIMITS

Product	Cents per lb except as noted			
	Pittsburgh	Chicago	Gary	Youngstown
Carbon steel				
Standard structural shapes	2.81	2.81	2.81	
Carnegie beams & bearing piling	2.76	2.76		
Plates	2.96	2.96	2.96	2.93
Floor plates	4.11	4.11		
Hot rolled bars	2.91	2.91	2.91	2.83
Concrete reinforcing bars	2.76		2.76	2.73
Hot rolled sheets 18 gauge & heavier	2.81	2.81	2.81	2.78
Galvanized sheets	3.91		3.91	
Cold rolled sheets	3.51		3.51	
Vitrename sheets	3.91		3.91	
Electric sheets (Electrical grade)	5.26		5.26	
Hot rolled strip			2.81	2.78
Standard rails:				
No. 1-OH	2.70	f.o.b. Shipping Mi		
No. 2-OH	2.60	f.o.b. Shipping Mi		
Tie plates	3.55	f.o.b. Shipping Mi		
Splice bars for standard rail	3.75	f.o.b. Shipping Mi		
Light rails (60 lb & under)	3.11			
Axles	4.51		4.51	
Holloware enameling black plate	4.71		4.71	
Hot dipped tin plate-cokes, 1.50 lb coating (pot yield)	\$6.70—per base box (freight to be added)	\$6.70—per base box (freight to be added)		

Alloy steel				
Alloy hot rolled bars	3.26	3.26	3.26	3.23
Alloy plates	3.76	3.76	3.76	
Alloy structural shapes				
Alloy bar shapes	3.51	3.51	3.51	3.48
Alloy strip	4.66		4.66	4.63
High strength—low alloy:				
Cor-ten:				
Plates	4.51	4.51	4.51	
Hot rolled sheets	4.26	4.26	4.26	4.23
Cold rolled sheets	5.26		5.26	
Galvanized sheets	5.96			
Hot rolled strip			4.26	4.23
Structural shapes	4.26	4.26	4.26	
CB's	4.26	4.26		
Bar and small shapes				
Bar and small shapes	4.41	4.41	4.41	4.38
Mar-ten				
Plates	4.01	4.01	4.01	
Hot rolled sheets	3.66	3.66	3.66	3.63
Hot rolled strip			3.66	3.63
Structural shapes	3.76	3.76	3.76	
CB's	3.76	3.76		
Bar and bar shapes	3.71	3.71	3.71	3.68
Abrasion resisting				
Plates	4.11	4.11	4.11	
Hot rolled sheets	3.96	3.96	3.96	3.93
Hot rolled strip			3.96	3.93

U. S. STEEL PRICE CUTS IN BRIEF

- **DOWN \$1 A TON**—Carbon structural shapes, carbon plates, hot rolled carbon bars, concrete reinforcing bars, hot rolled sheets (18 gage and heavier), hot rolled strip, standard rails, light rails, and oil country tubular goods (average figure for this item).
- **DOWN \$2 A TON**—Galvanized sheets, cold rolled sheets, enameling sheets, electrical sheets, cold rolled strip, cold finished bars, tie plates, splice bars, butt weld pipe (average) holloware block plate, all tin mill products, alloy products, Corten items, Mantex products, some types of abrasion resisting steels, barbed and twisted wire and reinforcing fabric.
- **DOWN \$3 A TON**—Floor plates, wire fencing, fence posts, nails and staples, poultry netting and carbon mechanical tubing (average).
- **DOWN \$4 A TON**—Carbon plates and structural shapes at Geneva (this represents the dropping of the \$3 a ton differential above Eastern prices plus the \$1 a ton reduction made at other points).
- **DOWN \$5 A TON**—Bale ties, screen cloth and wire rope (average).

American Steel & Wire Co. announced the following prices effective May 1:

(CONTINUED OF PAGE 125C)

Details on U. S. Steel Price Cuts Astound Other Steel Firms

New York

• • The depth and variety of the U. S. Steel price cuts last week astounded other steel firms. Some took 3 days to digest the precedent-making move. Many were wondering how they could meet the new lower prices and still not cut deeply into net income in months to come.

That most of the larger mills would be forced to fully or partially meet this price cutting move was expected. But the price cut will be hard medicine for some steel firms who are finding their costs still going up. First quarter earnings generally were below those of a year ago in the same period. Still to come were the bad financial effects of the coal strike and the new freight boosts.

The U. S. Steel move was one of the most unusual in steel history. In the past the company had been reluctant to reduce prices. It had done so only in the case of a price war when other large firms clipped the quoted prices to get business.

In the present instance any steel firm can have all the business it wants. Demand is expected to remain heavy for months to come, if not longer. Only one conclusion can be drawn from U. S. Steel's action—it will leave no stone unturned to prove that it is going all out in an attempt to smash inflation.

The rest of the steel industry has joined in the fight. It would be poor business for the larger units not to meet at least most of the new low prices. But smaller steel firms have a different problem.

Most smaller steel firms have higher costs due to labor rates, raw material prices and a lot of other troublesome things that only the small steelmaker really knows about. Whether they can match the cuts made by the bigger units remains to be seen.

One thing is certain—if later on it looks like the present experiment is a failure—higher steel prices will come—and fast. The steel price cutting move is real stuff. So much so that it hurts like hell. If the attempt fails later it will be a bitter and expensive lesson to Big Steel and to other companies who tried to stop the inflation balloon. Steel firms expect their suppliers

Changes Cover Wide Variety Of Items With Cuts Running From \$1 to \$5 a Ton

By TOM CAMPBELL
News Market Editor

to get into the spirit of the thing and quickly reduce prices on items sold to the industry. The present price slash hangs entirely on the assumption that the general price level effecting living costs and costs to steel plants will go down. Most steel people feel that it will take 3

months or more to see what happens.

Long and loud have been the cries from steel industry critics to "do something". The industry was called the "basic" one. It was chastized for trying to keep abreast of its higher costs. Now the shoe is on the other foot. Steel expects the government to put its full weight behind the price cutting move.

Steel leaders become red faced when the steel price cut is referred to as peanuts. To them it isn't by a long shot. But for once it will be interesting to see what happens when steel is in the lead in a fight on rising costs and backs it with some fancy trimming—when demand would easily sustain a boost in steel prices.

Inland Steel Slashes Prices

Chicago

• • • Inland Steel Co. moved into the inflation fight last week by reducing its steel prices on some products, holding the line on others and warning that its costs are rising. Wilfred Sykes, president of the firm said:

"Inland Steel Co. announces price reductions on most of its products, effective as of May 1, aggregating approximately \$3,500,000 annually.

"In arriving at our specific price reductions we are influenced primarily by our own manufacturing costs. We deemed it unsound to reduce the price of products which at present are selling at a loss or at a very inadequate profit. For example, we are making no reduction in

our prices of rails, structural shapes, plates or galvanized sheets.

"On the other hand, we are reducing our price on enameling sheets, used for stoves, kitchen utensils, refrigerators, and other consumer goods, by \$4 per ton as against the \$2 per ton reduction announced by our competitors. We are also cutting our price on floor plates \$5 per ton as compared with their cut of \$3 per ton. Reductions are being made in the prices of all of our other products to meet the competitive figures.

"While we are reducing our prices, we are mindful of the fact that our costs are increasing as a result of higher freight rates, advances in raw material prices, and other factors. We hope that our action will play a part in bringing about national stabilization."

STEEL COMPANY EARNINGS—FIRST QUARTER 1948 AND 1947

Company	First Quarter '48 Earnings	First Quarter '47 Earnings	Pct Change
U. S. Steel	\$33,957,341	\$39,234,511	—13.4
Bethlehem	15,499,331	16,090,426	—3.6
Republic	9,132,980	11,516,795	—20.8
Jones & Laughlin.....	5,150,704	6,337,132	—18.7
Youngstown Sheet & Tube....	5,150,704	6,337,132	—18.7
National	8,661,760	7,325,058	+18.2
Inland	8,458,544	7,995,857	+5.8
Armco	5,867,347	5,918,876	—0.8
Keystone	1,368,224	1,342,814	+0.2
Crucible	567,786	891,810	—36.4
Pittsburgh Steel	900,310	716,472	+25.7
Wheeling	2,781,257	2,948,268	—5.6
Allegheny Ludlum	1,307,471	1,826,609	—28.4
Alan Wood	672,110	491,593	+36.7

Steel Price Details

(CONTINUED FROM PAGE 125A)

Product	f.o.b. Cars Delivered Within Switching Limits		
	Cleveland	Pittsburgh	Chicago
	Cents per lb		
Cold finished bars	3.50	3.51	3.51
Hot rolled strip	2.80		

Tennessee Coal, Iron & Railroad Co. announced the following prices effective May 1, 1948:

Product	f.o.b. Cars Delivered Within Switching Limits of Bir- mingham, Ala., except as noted. Cents per lb	
Standard Structural Shapes (Not including Wide Flange Beams)	2.7875	
Plates	2.9375	
Hot Rolled Bars	2.8875	
Axles	4.4875	
Concrete Reinforcing Bars	2.7375	
Hot Rolled Sheets		
18 GA & Heavier	2.7875	
Galvanized Sheets	3.8875	
Hot Rolled Strip	2.7875	
Hollowware Enameling Black Plate	4.6875	
Hot Dipped Tin Plate Cokes		
1.50 lb Coating (Pot Yield)	\$6.80 Per Base Box (Freight to be added)	

The National Tube Co. decreased pipe and tubing prices, effective May 1, 1948. These reductions, which vary by item, average about \$3 per ton on carbon mechanical

and pressure tubing and \$2 per ton on alloy mechanical and pressure tubing, \$2 per ton on butt welded pipe and \$1 per ton on oil country tubular goods.

Geneva Steel Co. announced the elimination of the \$3 a ton differential over Eastern prices and the following new prices effective on May 1.

The following prices per lb will apply on carload lots f.o.b. delivered within the switching limits of Geneva, Utah:

Hot rolled carbon steel plates.....	2.925
Hot rolled carbon steel structural shapes...	2.775

Columbia Steel Co. announced the following prices on carload lots effective May 1, 1948:

Product	f.o.b. Cars Delivered Within Switching Limits	
	Cents per lb	
	Los Angeles	San Francisco
Standard structural shapes (not including wide flange beams)	3.424	3.4295
Hot rolled bars	3.579	3.5845
Tie plates		3.70*
Hot rolled sheets 18 gauge and heavier	3.494	3.4995
Galvanized sheets	4.624	4.6295
Hot rolled strip	3.554	3.5595

* f.o.b. cars, plant Pittsburg, Calif.

J&L Cuts Steel Prices

Pittsburgh

• • • Jones & Laughlin Steel Corp. price reductions which were slated to go to district offices early this week, will save its customers \$3 million on an annual basis, according to A. J. Hazlett, vice president.

Navy Buys Shipyard

Washington

• • • The Navy has purchased the shipbuilding yard and principal facilities of the Federal Shipbuilding and Dry Dock Co., Kearns, N. J., for \$2,375,000.

The Navy plans to preserve and maintain the property, but, in normal peacetime, does not propose to operate or lease the facility as a shipbuilding or repair plant. It will consider leases for other industrial purposes.

Portsmouth Reports Net

Portsmouth, Ohio.

• • • Net income of Portsmouth Steel Corp. for the first 3 months of 1948 totaled \$1,028,544 after all charges and taxes. This equal to 79¢ a share, it was announced by E. A. Schwartz, president, in an interim report to Portsmouth Steel stockholders.

Net income for the corresponding 3-month period in 1947 was \$1,009,320, or 75¢ per share.

On Mar. 1, 1948, Portsmouth Steel paid a dividend of 25¢ a share.

Builds Big Belt Press

Philadelphia

• • • A 4800-ton hydraulic press for vulcanizing rubber conveyor belts is being completed for Manhattan Rubber Div., Raybestos-Manhattan, Inc., Passaic, N. J. The press was engineered and is being built by the Baldwin Locomotive Works at its Southwark plant, Eddystone, Pa. The machine is approximately 53 ft long.

That demand for conveyor belt ing has exceeded production capacities is said to be attributable as much as anything else to a scarcity in large hydraulic vulcanizing presses.

Construction Steel . . .

New York

• • • The estimated total bookings of fabricated structural steel for the month of March 1948, according to reports received by the American Institute of Steel Construction, Inc., amounted to 215,884 tons. This is the largest monthly reported bookings since January 1946 and represents an increase of 44 pct over the 149,634 tons booked in March 1947, and 73 pct over the same averaged month in the 5 pre-war years 1936-1940.

• • • Fabricated steel awards this week included the following:

- 410 Tons, Savannah, Ga., Union Bag & Paper Co., boiler room, turbine room, millwright shop to Morton C. Tuttle, Boston.
- 285 Tons, Cheektowaga, N. Y., District 2 School, to R. S. McManus Steel Construction Co., Buffalo; John W. Cowper Co., Buffalo, general contractor.
- 260 Tons, Proviso, Ill., diesel engine shop for Chicago & Northwestern R.R. through S. N. Nielson & Sons, to Bethlehem Steel Co., Bethlehem.
- 230 Tons, Belleville, Ill., factory building for Eddy Paper Co. to Milwaukee Bridge Co., Milwaukee.
- 140 Tons, Baton Rouge, La., substation to Stone & Webster Engineering Corp., Boston.

90 Tons, Peoria County, Ill., bridge section FA-172 to Laclede Steel Co. through M. J. McDermott Co.

80 Tons, New York, precipitators for boiler at Hellgate Station for Consolidated Edison Co. to Grand Iron Works, Inc., New York.

65 Tons, New York, one-story factory building at 162nd St., to Grand Iron Works, Inc., New York.

• • • Fabricated steel inquiries this week included the following:

270 Tons, Grass Lake, Ill., state highway project, bids close May 30.

200 Tons, Cook County, Ill., tristate highway, Lawrence Ave., State Highway Dept., bids May 30.

190 Tons, Chicago, Wentworth Ave. state highway project, bids close May 30.

• • • Reinforcing bar awards this week included the following:

1275 Tons, Chicago, Research Institute for University of Chicago to J. W. Snyder Co.

380 Tons, Chicago, sanitary district sewer treatment extension through Kenny McHugh Co. to Jos. T. Ryerson & Son, Inc., Chicago.

340 Tons, Chicago, Nathan Goldblatt Memorial Hospital, University of Chicago, to J. W. Snyder Co.

• • • Reinforcing bar inquiries this week included the following:

825 Tons, Chicago, Paulina St. sewer, Chicago sanitary district.

100 Tons, Iowa City, Iowa, library building for the University of Iowa, bids close May 20.

Canadian Aluminum May Help Relieve Temporary Shortages — But

New York

• • The recent controversy over the projected size of the military force highlights the overall shortage of aluminum production in this country to meet demands beyond current civilian consumption. There are those who are inclined to look toward the production of the Aluminum Co. of Canada as a means of supplementing their own power-limited aluminum production. The peak production of Canada reached 500,000 net tons in 1943, a tempting invitation to consider potential Canadian production as a standby plant for United States requirements.

Canadian production was pushed up to 300,000 net tons in 1947 from the 1946 low point of 194,000 tons. Early this year, the company renewed two of its seven potlines at the Shawinigan Falls plant, so it appears that 1948 tonnage may be somewhat higher than 300,000 tons.

Canadian Aluminum Production
Net Tons

1947	298,000
1946	194,000
1945	214,000
1944	462,000
1943	496,000
1942	340,000
1941	214,000
1940	109,000
1939	83,000
1938	64,000

The LaTuque and Beauharnois plants are shut down because of lack of power, and the Arvida plant is operating only to the extent of available Shipshaw power.

Although large tonnages of Canadian aluminum ingots and products have been exported into the United States during and since the war, Aluminum Co. of Canada officials do not cherish the thought of the plant as standby facilities available for U. S. use. Demand for aluminum is increasing throughout the world, beyond the capacity of world production facilities, so Canadian aluminum officials would prefer to continue marketing their

Power Costs, Import Duties And Views of Officials Still Standby Talk

° ° °

By JOHN ANTHONY
Eastern Regional Editor

° ° °

production in excess of Canada's 66,000 ton requirements to their established consuming nations throughout the world.

Increased production to meet United States' requirements would mean operation with high cost purchased power or the construction of new power facilities for which Canadian officials do not see a need which might be sustained over a long period of years. There is also the 2¢ per lb import duty, reduced from 3¢ for a period of 3 years by the Geneva Conference Agreement, which makes it uneconomic for the Canadian producer to service the United States market on a permanent basis.

Canadian officials view the United States aluminum industry as inadequate to meet the expanding demands of the normal domestic peacetime economy. They point to the fact that the government held

an ingot aluminum stockpile of 385 million lb at the close of the war which has all been pumped into consuming pipelines, except 10 million lb frozen by the Munitions Board.

The arrival of 7 million lb of aluminum scrap from Canada in February caused a flurry of speculation in the domestic industry as to whether this flow of scrap might be expected to continue in subsequent months. Scrap comes in duty free under an extension of the import order which expires on June 30. Canadian company officials state that this was merely off-grade metal that comes out of the pot rooms in the first 40 days of production after reactivation of a plant. This scrap tonnage is the aftermath of the reopening of the two potlines at Shawinigan Falls. It compares with January scrap imports from Canada of only 1½ million lb.

The United Kingdom is the largest consumer of Canadian aluminum products at the present time, taking 22.3 and 25.8 million lb in January and February. The United States is the next largest consumer, and received 9.2 and 10.2 million lb in those months. Italy, Czechoslovakia and Germany were the next largest consumers of Canadian aluminum in recent months.

Coming Events

- May 11-12** American Steel Warehouse Assn., annual meeting, Chicago.
- May 13-14** American Management Assn., production conference, Chicago.
- May 15-22** International Petroleum Exposition, Tulsa, Okla.
- May 19** Bituminous Coal Research, Inc., annual meeting, Columbus, Ohio.
- May 26-27** American Iron & Steel Institute, meeting, New York (restricted to members only).
- May 27-29** Society for Experimental Stress Analysis, meeting, Pittsburgh.
- May 31-June 5** American Society of Mechanical Engineers, semiannual meeting, Milwaukee.
- June 6-9** American Gear Manufacturers Assn., annual meeting, Hot Springs, Va.
- June 7-9** American Coke and Coal Chemicals Institute, annual meeting, White Sulphur Springs, W. Va.
- June 10-12** National Steam Specialty Club, annual meeting, Hot Springs, Va.
- June 16-18** Electric Metal Makers Guild, annual meeting, Bethlehem.
- June 21-25** American Society for Testing Materials, annual meeting, Detroit.
- June 28-July 1** American Electroplaters' Society, Convention and Industrial Finishing Exposition, Atlantic City.

Builders Welcome First Tool Inquiries From Aircraft Producers

• • • First sign of the defense or preparedness programs around the machine tool industry put in an appearance this week in the form of inquiries from aircraft producers.

While this is largely a paper pick-up at this time, it is a welcome development to most recipients, very few of whom were able to report that April orders or inquiries were on a par with the preceding month. But bulk of the opinion bulled by ERP and a 60 group air force has it that the industry will go through this quarter and the third at about the present level.

A fair amount of interest is being shown in general purpose machines, but equipment for the machining of jet engine parts, principally the turbo-supercharged blades, is coming in for the lion's share, and producers of such equipment are in a key position at the moment.

Regardless of these developments, however, the industry will do well to surpass the \$300 million estimate for 1948 made by qualified sources some 4 months ago. Unfilled orders are low, primarily because the industry didn't get enough orders last year and shipments pretty consistently exceeded orders.

On the other hand, certain pro-

Reflect Caution in Terming This Paper Pick-Up; Few Report New Orders

o o o

ducers are in a bad way on foreign orders, because of the export hold-up and probably would like to be bailed out one way or another. One company has about \$500,000 tied up in such machines and another, \$250,000, and others have plenty of equipment on the floor they can't dispose of, much of it calibrated in the metric system.

Some of this foreign business was taken with a certain amount of risk, reflecting rather clearly that the machine tool business as far as new firm orders are concerned has been leaving something to be desired. A portion of this business was accepted directly, and not through any of the various purchasing missions, and in many of these cases it is the responsibility of the seller to secure the export license.

Some observers interpret the willingness to accept business with this element of risk not only as an indication of a scarcity of new firm orders from domestic customers, but as evidence of a certain amount of nervousness as to price as well. It is true that machine tool prices are high, in comparison with 1939 levels, but it is equally true that they are low compared with the prices of other things, including automobiles and labor.

The acceptance of foreign business with the element of risk also makes it tough for competitors who must take orders on the same basis or risk offending foreign buyers, for the future, and lose the present business simultaneously.

In the East, according to more complete information available than a week ago, New England builders generally averaged 10 pct to 20 pct less business in the first quarter of this year than in the first 1947 quarter. The exception may be considered rare. In contrast, many did

more business the first 1948 quarter than in the last 1947 quarter. But apparently, a full third did pct to 20 pct less.

It became evident to many at the end of March that they were in for a drab second quarter and that at the end of April many plants would be down to hard pan. That supposition apparently has been borne out.

The plant operating at capacity is rare. Quite possibly 99 pct are not. Occasionally a plant has enough business on its books to guarantee current production schedule more than 15 weeks. The majority have approximately 8 weeks unfilled business or less; some more than a month.

* * *

James Y. Scott, president, V. Norman Co., Springfield, Mass., and Morse Twist Drill Co., New Bedford, Mass., has been named special emissary by the American Society of Tool Engineers to the Institution of Production Engineers in England. Mr. Scott will attend a meeting of the British organization at Wolverhampton, England, May 2 at which he will present to the president of the Institution an honorary life membership in ASTE. The ASTE president holds a similar membership in the British IPE.

Monarch Earnings

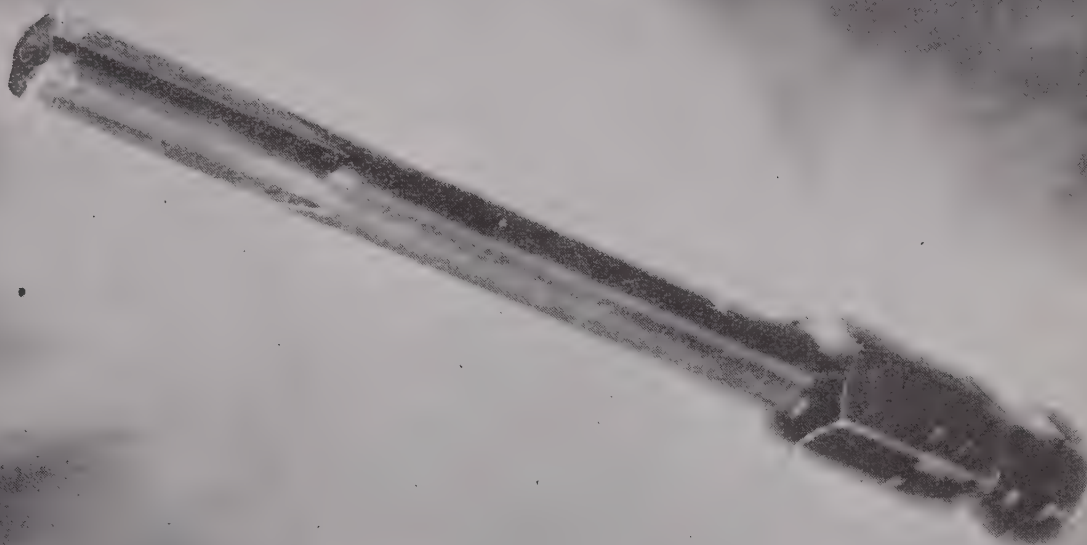
Sidney, Ohio

• • • Net earnings of Monarch Machine Tool Co. for first quarter 1948 totaled \$107,147, equal to 51¢ a share, compared with \$194,320, or 92¢ a share in the first quarter of 1947. Jerome A. Raterman, Monarch president, said earnings this year were 6.43 pct in relation to sales of \$1,665,955. Last year sales were \$2,318,045 for the same period.

National Acme Net

Cleveland

• • • Directors of National Acme Co. declared the usual quarterly dividend of 50¢ a share payable May 25 to stock of record May 11, after approving first quarter earnings. Net income for the Mar. 31 quarter, after all charges including \$202,000 provision for federal income taxes, was \$325,252, equal to 65¢ a share. This compares with net income of \$605,435, or \$1.21 a share in the first quarter last year.



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It is a stock bit, taken out of production shipment and was used in a power driver on $\frac{5}{16}$ "-24x $\frac{7}{8}$ " flat CLUTCH HEAD door hinge screws . . . an operation calling for unusually high torque driving.

It is important to note that this bit served continuously on the assembly line . . . *that there was no interruption for reconditioning* during this 214,000 driving spell.

Moreover, this bit can be *repeatedly restored to its original efficiency* by a simple application of the end surface to a grinding wheel.

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Tool economy is only one of the many exclusive advantages offered by CLUTCH HEAD for faster, safer, and lower-cost assembly operation. Investigate them.



Check the perfect operation of this screw with an ordinary type screwdriver or any flat blade, reasonably accurate in width. Thickness of the blade is secondary.

UNITED SCREW AND BOLT CORPORATION

CLEVELAND 2

CHICAGO 8

NEW YORK 7

Here's a Crane that's Tailor Made for Handling **SCRAP!**



Special Axle:

New type axle has been increased in width and height. Multiple-hinged shoes have been increased in width from 20" to 24". The new UNIT 1020A now has equal stability on both sides and end. Handles a 45" Magna with ease.

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- Heavier, air-cooled Double Disc Clutches . . . for smooth performance and easy operation.
- Improved Automatic Traction Brakes with sectional linings which are easily replaced without removing shaft from machine.
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- New style foot brakes with self-aligning bearings on brake operating shafts. Wider, self-equalizing brake bands which eliminate dragging or scoring.



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Hand operated swing lock control within easy reach of operator . . . no more stooping, kicking, or leaving cab for this operation.



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This elevated Fairlead is especially adapted for magnet operation. It equalizes cable contact on two sheaves instead of one, minimizes unnecessary wear.



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Market Remains Firm and Active

New York

• • For another week market prices have continued their remarkable stability. Movement in most districts continued at high levels in both steelmaking and cast items.

The underlying strength in the market is still there and reports out of district buying continue to circulate. But at the same time mills and foundries are generally much better fixed in the way of scrap material than they have been for months. Heavy shipments through April have apparently more than matched consumption.

With the coal strike forgotten at least temporarily, the threatened broad walkout has taken over the center of spotlight. It is doubtful that more than a freight stoppage of a few hours will be permitted, and that an occurrence should be only a temporary setback to scrap movements with no effect on prices or on mill and foundry operations.

On the subject of rail movements, dealers insist that the freight hike scheduled for May 6th will have to be absorbed by the mills on new orders. The brokers are to be stuck with old orders.

Paul Hoffman, European Recovery Program head, has gone on record with statements that current plans do not call for any scrap exports to Europe and that he hopes controls and allocating will not prove necessary. At any rate, demand for scrap can hardly be stepped up regardless of ERP requirements as the mills expect capacity operations to last indefinitely anyway.

Plans for formation of an American corporation to effect immediate return of 1 million tons of scrap from Germany have been announced. It is hoped in many quarters that the company's efforts will prove more successful than those of one of the mills who purchased 5,000 tons of material 2 years ago and finally got delivery on 7000 tons of it via Genoa, Italy, a week ago.

PITTSBURGH—Some sources say the market undertone is one of weakness, others see signs of strength, particularly in the better low phosphorus grades. It is still a toss-up because there have been no major price changes in the past week. More scrap is coming out though not enough to lower prices and in many cases its quality is said to be inferior. Reflecting the lifting of pressure on short shoveling turnings caused by the coal strike, this grade slid off 50 cents in the past week and is quotable at \$38 to \$38.50. Blast furnace operators here reportedly have not paid more than \$36.50 for these turnings on the last sale and one of the big local buyers is now out of the market.

CHICAGO—Except for certain brokers still paying \$40 for openhearth scrap, the market remained quiet last week. Quiet, that is, disregarding the \$43 price for No. 1 bundles and \$46 for electric furnace bundles and who knows what for plate scrap that was ostensibly bought as No. 1 heavy melting. Formula \$39.50 remains in vogue with all deals calculated plus or minus from this base figure. Some foundries have refused to take any more high priced cast, but the representative tonnages moving are still at the high prices.

PHILADELPHIA—The market continues to be very strong but there are no new price developments in delivered prices. Brokers are paying 50¢ more to dealers on heavy melting and blast furnace grades, which brings down their margin to 50¢ a ton. The new freight rates will not be applicable until May 6. It is forecast that dealers will insist that mills absorb the extra cost on new orders. Brokers will absorb it on old orders.

CLEVELAND—Consumers here and in the Valley are in comfortable position as a result of three weeks' good shipments. April was a heavy month, but probably marks the end of the movement of material from the Southwest until fall. Whether the heavy shipments are an indication that too much money is being paid or that prices are too high is somewhat problematical. In any event, one mill in this area has dropped out of the market on blast furnace, and others will probably follow, because this material is often of poor quality, and in long supply and rejections are running pretty high at the moment. Cast is also off in demand, but despite the availability of these grades, there is no softness in price.

DETROIT—While Detroit mills continue to obtain delivery of scrap pur-

chased at formula prices, the undertone of the market for openhearth grades is strong. Some sources report that many local dealers are selling scrap regularly to out-of-town buyers at prices above the formula. The demand for electric furnace grades is also strong. As a result of extensive auto plant and foundry shutdowns, the price of foundry cast is sagging. Forecasts indicate that extended plant closings here during May may cut severely into the volume of available production scrap.

CINCINNATI—Prices are at formula in theory but not in practice. A local consumer stepped out this week and bought openhearth grades at \$41.50—\$2 over the formula—loaded up for 30 days and got out of the market. This is the first over-the-formula break in this market for some weeks, although buyers from other districts have been keeping active. Foundry grades, including cast, are quiet at the moment, pending a return to normalcy in coke supplies.

NEW YORK—Steadiness of market prices continued for another week with good movement in steelmaking scrap being maintained. Cast items were also moving in good quantity. Some of the smaller foundries were not in the market, but the larger ones were taking all they could, and were getting substantial amounts.

BUFFALO—A strong undertone featured the market, highlighted by a \$2 increase in cast scrap. Large scale buying of mixed cupola by a big foundry at \$64 propped other items in this bracket, and small lot buyers continued to pay even higher prices. Strength spread to steel grades as consumers showed more interest, and No. 1 heavy melting jumped \$1 to a top of \$45. Competition for the better grades is keen and the equivalent of \$46 to \$46.75, delivered Buffalo, was paid recently for government scrap offerings. Shipments of openhearth at the formula are fairly good, but quality is generally low.

BIRMINGHAM—Undertone for openhearth grades is weaker in this market, but that for cast is stronger. No. 1 cupola cast is selling for as high as \$67. Movement of foundry steel has dropped off sharply with little material of that type being prepared.

BOSTON—Shipments of scrap continue spotty with few price changes. Of half a dozen dealers, only one reported a brisk demand. All others said there was very little doing.

ST. LOUIS—Increased movement of scrap to the St. Louis industrial district is allowing mills to build up their stockpiles while maintaining consumption rates. Cast iron is the only weak spot in the market.

IRON AND STEEL SCRAP PRICES

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. melting.....	\$40.00 to \$40.50
RR. hvy. melting.....	41.00 to 41.50
No. 2 hvy. melting.....	40.00 to 40.50
RR. scrap rails.....	55.50 to 56.50
Rails 2 ft and under.....	62.50 to 63.50
No. 1 comp'd bundles.....	40.00 to 40.50
Hand bldd. new shts.....	40.00 to 40.50
Hvy. axle turn.....	41.50 to 42.00
Hvy. steel forge turn.....	41.50 to 42.00
Mach. shop turn.....	35.50 to 36.00
Shoveling turn.....	38.00 to 38.50
Mixed bor. and turn.....	35.50 to 36.00
Cast iron boring.....	38.00 to 38.50
No. 1 cupola cast.....	63.00 to 65.00
Hvy. breakable cast.....	52.50 to 53.50
Malleable.....	77.00 to 79.00
RR. knuck. and coup.....	54.50 to 55.50
RR. coil springs.....	54.50 to 55.50
RR. leaf springs.....	54.50 to 55.50
Rolled steel wheels.....	54.50 to 55.50
Low phos.....	47.00 to 47.50

CHICAGO

Per gross ton delivered to consumer:

No. 1 hvy. melting.....	\$39.00 to \$39.50
No. 2 hvy. melting.....	39.00 to 39.50
No. 1 bundles.....	39.00 to 39.50
No. 2 dealers' bundles.....	39.00 to 39.50
Bundled mach. shop turn.....	37.00 to 37.50
Galv. bundles.....	35.00 to 35.50
Mach. shop turn.....	34.00 to 34.50
Short shov. turn.....	35.50 to 36.50
Cast iron borings.....	35.50 to 36.50
Mix. borings & turn.....	34.00 to 34.50
Low phos. hvy. forge.....	44.00 to 48.00
Low phos. plates.....	42.50 to 45.00
No. 1 RR. hvy. melt.....	41.75 to 43.50
Rerolling rails.....	52.00 to 54.00
Miscellaneous rails.....	50.00 to 52.00
Angles & splice bars.....	52.00 to 53.00
Locomotive tires, cut.....	54.00 to 55.00
Cut boiler & side frames.....	49.00 to 51.00
Standard stl. car axles.....	58.00 to 59.00
No. 3 steel wheels.....	51.00 to 52.00
Couplers & knuckles.....	51.00 to 52.00
Rails, 2 ft and under.....	55.00 to 57.00
Malleable.....	76.00 to 78.00
No. 1 mach. cast.....	70.00 to 73.00
No. 1 agricul. cast.....	61.00 to 65.00
Heavy breakable cast.....	51.00 to 52.00
RR. grate bars.....	59.00 to 61.00
Cast iron brake shoes.....	58.00 to 60.00
Cast iron carwheels.....	58.00 to 60.00

CINCINNATI

Per gross ton delivered to consumer:

No. 1 hvy. melting.....	\$38.50 to \$39.50
No. 2 hvy. melting.....	38.50 to 39.50
No. 1 bundles.....	38.50 to 39.50
No. 2 bundles.....	38.50 to 39.50
Mach. shop turn.....	33.00 to 33.50
Shoveling turn.....	35.00 to 35.50
Cast iron borings.....	32.50 to 33.00
Mixed bor. & turn.....	32.50 to 33.00
Low phos. plate.....	46.00 to 48.00
No. 1 cupola cast.....	63.00 to 64.00
Hvy. breakable cast.....	53.00 to 54.00
Rails 18 in. & under.....	60.00 to 61.00
Rails random length.....	51.00 to 52.00
Drop-broken.....	66.00 to 68.00

BOSTON

Dealers' buying prices, per gross ton, f.o.b. Boston

No. 1 hvy. melting.....	\$31.65 to \$31.90
No. 2 hvy. melting.....	31.65 to 31.90
Nos. 1 and 2 bundles.....	31.65 to 31.90
Busheling.....	31.65 to 31.90
Shoveling turn.....	28.90
Machine shop turn.....	26.90
Mixed bor. & turn.....	26.90
Cl'n cast chem. bor.....	38.00 to 40.00
No. 1 machinery cast.....	56.00 to 60.00
No. 2 machinery cast.....	55.00 to 57.00
Heavy breakable cast.....	50.00 to 52.00
Stove plate.....	52.00 to 53.00

DETROIT

Per gross ton, brokers' buying prices f.o.b. cars:

No. 1 hvy. melting.....	35.50
No. 2 hvy. melting.....	35.50
No. 1 bundles.....	35.50
New busheling.....	35.50
Flashings.....	35.50
Mach. shop turn.....	\$29.00 to 29.50
Shoveling turn.....	30.00 to 30.50
Cast iron borings.....	30.00 to 30.50
Mixed bor. & turn.....	28.50 to 29.00
Low phos. plate.....	39.50 to 40.50
No. 1 cupola cast.....	55.00 to 57.00
Heavy breakable cast.....	48.00 to 52.00
Stove plate.....	50.00 to 52.00
Automotive cast.....	55.00 to 57.00

Going prices as obtained in the trade by THE IRON AGE, based on representative tonnages.

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. melting.....	\$41.50 to \$42.00
No. 2 hvy. melting.....	38.50 to 39.00
No. 1 bundles.....	41.50 to 42.00
No. 2 bundles.....	38.50 to 39.00
Mach. shop turn.....	34.00 to 34.50
Shoveling turn.....	34.00 to 34.50
Mixed bor. & turn.....	34.00 to 34.50
Clean cast chemical bor.....	42.00 to 44.00
No. 1 machinery cast.....	65.00 to 66.00
No. 1 mixed yard cast.....	62.00 to 63.00
Hvy. breakable cast.....	61.00 to 62.00
Clean auto cast.....	65.00 to 66.00
Hvy. axle forge turn.....	43.00 to 44.00
Low phos. plate.....	47.00 to 48.00
Low phos. punchings.....	47.00 to 48.00
Low phos. bundles.....	45.00 to 46.00
RR. steel wheels.....	52.00 to 53.00
RR. coil springs.....	52.00 to 53.00
RR. malleable.....	75.00 to 78.00
Cast iron carwheels.....	68.00 to 70.00

ST. LOUIS

Per gross ton delivered to consumer:

No. 1 hvy. melting.....	\$41.00 to \$42.00
No. 2 hvy. melting.....	37.50 to 38.50
Bundled sheets.....	37.50 to 38.50
Mach. shop turn.....	33.00 to 33.50
Locomotive tires, uncut.....	46.00 to 47.00
Mis. std. sec. rails.....	46.50 to 47.50
Steel angle bars.....	49.00 to 50.00
Rails 3 ft and under.....	52.00 to 53.00
RR. steel springs.....	48.50 to 49.50
Steel car axles.....	48.50 to 49.50
Grate bars.....	60.00 to 62.00
Brake shoes.....	58.00 to 60.00
Malleable.....	71.00 to 72.00
Cast iron car wheels.....	61.00 to 62.00
No. 1 machinery cast.....	65.00 to 67.00
Hvy. breakable cast.....	59.00 to 60.00

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting.....	37.50
No. 2 hvy. melting.....	37.50
No. 2 bundles.....	37.50
No. 1 busheling.....	37.50
Long turnings.....	\$25.00 to 26.00
Shoveling turnings.....	27.00 to 28.00
Cast iron borings.....	26.00 to 27.00
Bar crops and plate.....	42.50 to 43.50
Structural and plate.....	42.50 to 43.50
No. 1 cupola cast.....	64.00 to 67.00
Stove plate.....	55.00 to 58.00
No. 1 RR. hvy. melt.....	38.50 to 40.00
Steel axles.....	38.00 to 39.00
Scrap rails.....	44.00 to 45.00
Rerolling rails.....	51.00 to 53.00
Angles & splice bars.....	51.00 to 53.00
Rails 3 ft & under.....	52.00 to 55.00
Cast iron carwheels.....	48.00 to 50.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. melting.....	\$40.00 to \$40.50
No. 2 hvy. melting.....	40.00 to 40.50
Mach. shop turn.....	35.00 to 35.50
Short shov. turn.....	37.00 to 37.50
Cast iron borings.....	36.00 to 36.50
Low phos.....	45.00 to 45.50

NEW YORK

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting.....	34.50
No. 2 hvy. melting.....	34.50
No. 2 bundles.....	34.50
Mach. shop turn.....	\$29.00 to 29.50
Mixed bor. & turn.....	29.00 to 29.50
Shoveling turn.....	31.00 to 32.00
No. 1 cupola cast.....	55.00 to 56.00
Clean auto cast.....	55.00 to 56.00
Hvy. breakable cast.....	54.00 to 55.00
Charging box cast.....	54.00 to 55.00
Unstrp. motor blks.....	51.00 to 52.00
Cl'n cast chem. bor.....	34.50 to 35.50

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. melting.....	\$39.75 to \$40.00
No. 2 hvy. melting.....	39.75 to 40.00
No. 1 bundles.....	39.75 to 40.00
No. 2 bundles.....	39.75 to 40.00
No. 1 busheling.....	39.75 to 40.00
Mach. shop turn.....	34.75 to 35.00
Shoveling turn.....	35.00 to 35.50
Cast iron borings.....	35.00 to 35.50
Mixed bor. & turn.....	35.00 to 35.50
Mixed cupola cast.....	62.00 to 63.00
Charging box cast.....	56.00 to 57.00
Stove plate.....	62.00 to 63.00
Clean auto cast.....	62.00 to 63.00
RR. malleable.....	70.00 to 71.00
Small indl. malleable.....	47.00 to 48.00
Low phos. plate.....	44.75 to 45.75
Scrap rails.....	50.00 to 51.00
Rails 3 ft & under.....	57.00 to 58.00
RR. steel wheels.....	51.00 to 52.00
Cast iron carwheels.....	51.00 to 52.00
RR. coil & leaf spgs.....	51.00 to 52.00
RR. knuckles & coup.....	51.00 to 52.00

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. melting.....	\$39.50 to \$40.00
No. 2 hvy. melting.....	39.50 to 40.00
No. 1 bundles.....	39.50 to 40.00
No. 1 busheling.....	39.50 to 40.00
Drop forge flashings.....	39.50 to 40.00
Mach. shop turn.....	34.50 to 35.00
Shoveling turn.....	35.50 to 36.00
Steel axle turn.....	39.50 to 40.00
Cast iron borings.....	35.50 to 36.00
Mixed bor. & turn.....	35.50 to 36.00
Low phos.....	44.50 to 45.00
No. 1 machinery cast.....	65.00 to 66.00
Malleable.....	75.00 to 76.00
RR. cast.....	70.00 to 71.00
Railroad grate bars.....	60.00 to 61.00
Stove plate.....	60.00 to 61.00
RR. hvy. melting.....	40.00 to 41.00
Rails 3 ft & under.....	60.00 to 61.00
Rails 18 in. & under.....	61.00 to 62.00

SAN FRANCISCO

Per gross ton f.o.b. shipping point:

No. 1 hvy. melting.....	\$39.50 to \$40.00
No. 2 hvy. melting.....	39.50 to 40.00
No. 2 bales.....	39.50 to 40.00

Per gross ton delivered to consumer:

No. 3 bales.....	\$31.00 to 31.50
Mach. shop turn.....	31.00 to 31.50
Elec. furn. 1 ft under.....	\$32.00 to 32.50
No. 1 cupola cast.....	44.00 to 45.00
RR. hvy. melting.....	44.00 to 45.00

LOS ANGELES

Per gross ton f.o.b. shipping point:

No. 1 hvy. melting.....	\$22.00 to 22.50
No. 2 hvy. melting.....	22.00 to 22.50
No. 1 bales.....	22.00 to 22.50
No. 2 bales.....	22.00 to 22.50
No. 3 bales.....	22.00 to 22.50
Mach. shop turn.....	22.00 to 22.50
No. 1 cupola cast.....	\$40.00 to 40.50
RR. hvy. melting.....	40.00 to 40.50

SEATTLE

Per gross ton delivered to consumer:

No. 1 & No. 2 hvy. melt.....	\$22.00 to 22.50
Elec. furn. 1 ft and under.....	22.00 to 22.50
No. 1 cupola cast.....	44.00 to 45.00
RR. hvy. melting.....	44.00 to 45.00

HAMILTON, ONT.

Per gross ton delivered to consumers
Cast grades f.o.b. shipping point.

Heavy melting.....	\$22.00 to 22.50
No. 1 bundles.....	22.00 to 22.50
No. 2 bundles.....	21.00 to 21.50
Mechanical bundles.....	20.00 to 20.50
Mixed steel scrap.....	19.00 to 19.50
Mixed borings and turnings.....	17.00 to 17.50
Rails, remelting.....	23.00 to 23.50
Rails, rerolling.....	26.00 to 26.50
Bushelings.....	17.00 to 17.50
Bushelings, new fact, prep'd.....	21.00 to 21.50
Bushelings, new fact, unprep'd.....	16.00 to 16.50
Short steel turnings.....	17.00 to 17.50
No. 1 cast.....	\$42.00 to 42.50
No. 2 cast.....	35.00 to 35.50
*Ceiling Price.	

Basing Point Decision Plagues Metal Market

York

• The decision of the Supreme Court which prohibits the use of multiple basing point pricing is the subject of conferences of the high officials of every metal producing company. So far there is no evidence of any course of action having been decided upon. Metal indicators are also vitally concerned with the results of study by the producers. Their decisions as to pricing policy must be taken in the light of the action of metal producers. Several officials have expressed the opinion that to prevent chaotic marketing conditions from developing in the metal industry, it will be necessary for Congressional action to be taken.

The decision has opened up speculation on the part of industry members that metals with a single basing point, such as zinc and aluminum, and those on a delivered basis, such as aluminum and magnesium, will also require new pricing methods. Freight absorption and phantom freight charges involved in those marketing methods. Without having had the opportunity to make a full study of the cement industry decision, some industry members are of the opinion that single basing point and delivered price marketing are no longer legal.

Price Rise Near

York

• Pressure for zinc requirements continues to exceed available supplies. Coupled with this state of market there is the immediate prospect of a price increase. Joplin producers are agitating again for a higher concentrates price which would have to be reflected in higher domestic market price. As a result of the feeling that zinc prices must be increased, concentrates are being sold on the basis of the average monthly price, a practice which preceded by more than a month the latest price advance. In addition, the foreign market price has advanced to 10¢ f.a.s. Gulf ports, a price high

enough to siphon off large tonnages of imported concentrates in view of the duty of .875¢, at present market levels. At weekend there was no evidence of a price increase, but there is no doubt that an increase can be long deferred.

Aluminum Ingot Rises Build Demand For Zinc

New York

• • • Prices of secondary aluminum ingot have been steadily increased during April. Major producers have announced a series of price increases totaling 2¢ to 3¢ per lb during the month, including the most recent increases last week. Current price levels for secondary aluminum ingot are from 2.5¢ to 4¢ per lb above corresponding grades

Monthly Average Prices

• • • The average prices of the major nonferrous metals in April based on quotations appearing in THE IRON AGE, were as follows:

	Cents Per Pound
Electrolytic copper, Conn. Valley	21.50
Lake copper, Conn. Valley	21.625
Straits tin, New York ..	94.00
Zinc, East St. Louis....	12.00
Zinc, New York.....	12.61
Lead, St. Louis.....	17.011
Lead, New York.....	17.211

of primary ingot. Aluminum remelters point out that the sharp increase in prices is due solely to the more active buying of segregated scrap by primary producers at increasingly higher prices.

This development has had an important bearing on the market for the die casting grade of zinc, already pushed to capacity. Market sources say that the normal price level for the die casting grades of aluminum is at twice the price of

Special High Grade zinc. Recent increases in aluminum ingot have thrown this relationship out of balance and have increased buying pressure on zinc, which is not available. If the metal could be had, this development would be likely to reverse the trend which in 1947 showed an increase in zinc die casting tonnage of only about 30 pct compared with an increase of about 70 pct in aluminum tonnage.

Drops Brass Ingot Prices

New York

• • • The seller of brass ingot at 1/4¢ above the market dropped his prices to market levels last week but continues to sell Navy "M" and yellow ingot well below the market. Recent higher prices reflected the heavy demand for scrap by all ingot producers which required the payment of higher prices. Now scrap is flowing freely. Current foundry demand for ingots is reported to be poor, despite the fact that secondary ingot prices are several cents per pound below the level of ingots made from primary metals.

Ford Turning Out Strip From Renovated Mill

Detroit

• • • The steel mill purchased last year by Ford Motor Co. from Granite City Steel Co. and converted into an 84-in. skin pass mill began turning out strip steel at the Rouge March 30. The new mill will operate at a speed up to 1350 fpm. It handles steel up to 78 in. in width.

The mill purchased from Granite City was rebuilt and erected in the record time of less than 3 months. Ford officials estimate the cost of the installation at \$1,500,000. Ford is currently spending more than \$20 million for its steel expansion program.

Nonferrous Metals Prices

	Apr. 28	Apr. 29	Apr. 30	May 1	May 3	May 4
Copper, electro, Conn.	21.50	21.50	21.50	21.50	21.50	21.50
Copper, Lake, Conn.	21.625	21.625	21.625	21.625	21.625	21.625
Tin, Straits, New York	94.00	94.00	94.00	94.00	94.00	94.00
Zinc, East St. Louis	12.00	12.00	12.00	12.00	12.00	12.00
Lead, St. Louis	17.30	17.30	17.30	17.30	17.30	17.30

Primary Metals

(Cents per lb. unless otherwise noted)

Aluminum, 99+%, 10,000 lb. f.o.b. shipping point, freight allowed....	15.00
Aluminum pig, f.o.b. shipping point	14.00
Antimony, American, Laredo, Tex....	33.00
Beryllium copper, 3.75-4.25% Be dollars per lb contained Be.....	\$20.50
Beryllium aluminum 5% Be, dollars per lb contained Be.....	\$40.00
Cadmium, del'd	\$1.75
Cobalt, 97-99% (per lb).....	\$1.65 to \$1.72
Copper electro, Conn. Valley.....	21.50
Copper, lake, Conn. Valley.....	21.625
Gold, U. S. Treas., dollars per oz....	\$35.00
Indium, 99.8%, dollars per troy oz....	\$2.25
Iridium, dollars per troy oz....	\$105 to \$115
Lead, St. Louis	17.30
Lead, New York	17.50
Magnesium, 99.8+%, f.o.b. Freeport, Tex.	20.50
Magnesium, sticks, carlots.	34.50
Mercury, dollars per 76-lb flask, f.o.b. New York.....	\$76.50 to \$77
Nickel, electro, l.o.b. New York....	36.56
Palladium, dollars per troy oz....	\$24.00
Platinum, dollars per troy oz....	\$98 to \$101
Silver, New York, cents per oz....	74.625
Tin, Grade A, New York.....	94.00
Zinc, East St. Louis.....	12.00
Zinc, New York	12.61
Zirconium copper, 6 pct Zr, per lb contained Zr.	\$8.75

Remelted Metals

Brass Ingot

(Cents per lb, in carloads)

85-5-5-5 ingot	
No. 115	19.25
No. 120	18.75
No. 123	18.25
80-10-10 ingot	
No. 305	24.25
No. 315	21.75
83-10-2 ingot	
No. 210	30.00
No. 215	28.00
No. 245	22.25-22.75
Yellow ingot	
No. 405	15.25-16.00
Manganese bronze	
No. 421	18.00

Aluminum Ingot

(Cents per lb, lots of 30,000 lb)

95-5 aluminum-silicon alloys	
0.30 copper, max.	20.50-20.75
0.60 copper, max.	20.25-20.50
Piston alloys (No. 122 type)...	18.50-18.75
No. 12 alum. (No. 2 grade)...	18.25
108 alloy	18.50
195 alloy	18.75-19.00
13 alloy	20.50-20.75
ANS-679	18.75
Steel deoxidizing aluminum, notch-bar granulated or shot	
Grade 1-95 pct-95% pct.....	18.50-19.00
Grade 2-92 pct-95 pct.....	18.00-18.50
Grade 3-90 pct-92 pct.....	17.75-18.00
Grade 4-85 pct-90 pct.....	17.00-17.50

Electroplating Supplies

Anodes

(Cents per lb, f.o.b. shipping point in 500 lb lots)

Copper, frt. allowed	
Cast, oval, 15 in. or longer.....	37%
Electrodeposited	32%
Rolled, oval, straight, delivered...	33.09
Brass, 80-20, frt. allowed	
Cast, oval, 15 in. or longer.....	33%
Zinc, cast, 99.99	20.50
Nickel 99 pct plus, frt. allowed	
Cast	51
Rolled depolarized	52
Silver 999 fine	
Rolled, 1900 oz lots per troy oz....	67%

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drums.....	43.00
Copper sulfate, 99.5, crystals, bbls..	11.50
Nickel salts, single, 425 lb bbls. frt. allowed	14.50
Silver cyanide, 100 oz. lots, per oz.	54.00
Sodium cyanide, 96 pct domestic, 100 lb drums	15.00
Zinc cyanide, 100 lb drums.....	34.00
Zinc sulfate, 89 pct, granules, bbls. frt. allowed	7.75

Mill Products

Aluminum

(Base prices, cents per pound, base 30,000 lb., f.o.b. shipping point, freight allowed.)

Flat Sheet: 0.188 in., 2S, 3S, 24c; 4S, 61S-O, 25.8c; 52S, 27.7c; 24S-O, 24S-OAL, 26.7c; 75S-O, 75S-OAL, 32.7c. 0.081 in.; 2S, 3S, 25c; 4S, 61S-O, 27.1c; 52S, 29c; 24S-O, 24S-OAL, 27.7c; 75S-O, 75S-OAL, 34.3c. 0.032 in.; 2S, 3S, 26.4c; 4S, 61S-O, 30.1c; 52S, 32.6c; 24S-O, 24S-OAL, 34.2c; 75S-O, 75S-OAL, 43.1c.	
Plate: 1/4 in. and heavier; 2S, 3S, 21.2c; 4S-F, 23.2c; 52S, 24.2c; 61S-O, 23.8c; 24S-F, 24S-FAL, 24.2c; 75S, 75S-AL, 30.5c.	
Extruded Solid Shapes: Shape factors 1 to 4; 31c to 59c; 11 to 13, 31.9c to 69c; 23 to 25, 33.4c to 90c; 35 to 37, 40.8c to \$1.25; 47 to 49, 58.7c to \$1.84.	
Extruded Round Rod, Square, Hex, Octagonal Bar: 1/4 in. and over, 27c to 38c; 1/2 to 3/4 in., 28c to 40.5c; 3/4 to 1 1/2 in., 29c to 43c; 1 1/2 to 3 in., 30c to 46.5c; 3 to 4 in., 32.5c to 53.5c; 4 to 6 in., 35.5c to 62c.	
Rolled Rod: 1.064 to 4.5 in., 2S, 3S, 30c to 26.5c; Cold-finished rod, 0.375 to 3.5 in., 2S, 3S, 32c to 28c.	
Screw Machine Stock: Drawn, 1 1/2 to 1/4 in., 11S-T3, 34c to 45c; cold-finished, 3/8 to 1 1/2 in., 11S-T3, 33c to 31c; rolled, 1 1/2 to 8 in., 11S-T3, 31c to 28.5c.	
Drawn Wire: coiled, 0.051 to 0.374 in.; 2S, 33c to 24c 52S, 40.5c to 29c; 56S, 42.5c to 34.5c; 17S-T4, 46c to 31c; 61S-T4, 41c to 30.5c; 75S-T6, 66c to 46c.	

Magnesium

(Cents per lb, f.o.b. mill, freight allowed.)

Base quantity 30,000 lb.)

Sheet and Plate: Ma. FSA. 1/4 in., 54c-56c; 0.188 in., 56c-58c; B & S gage 8, 58c-60c; 10, 59c-61c; 12, 63c-65c; 14, 69c-74c; 16, 76c-81c; 18, 84c-89c 20, 96c-\$1.01; 22, \$1.22-\$1.31; 24, \$1.62-\$1.75. Specification grade higher.	
Round Rod: M, diam., in., 1/2 to 3/4, 47c; 1/2 to 3/4, 45c; 1 1/2 to 2 1/2, 43.5c; 3 1/2 to 5, 42.5c. Other alloys higher.	
Square, Hexagonal Bar: M, size across flats, in., 1/4 to 3/4, 52.5c; 1/2 to 3/4, 47.5c; 1 1/2 to 2 1/2, 45c; 3 1/2 to 5, 44c. Other alloys higher.	
Solid Shapes, Rectangles: M, form factors, 1 to 4, 46c; 11 to 13, 49c; 20 to 22, 51.5c; 29 to 31, 59.5c; 38 to 40, 75.5c; 47 to 49, 98c. Other alloys higher.	
Round Tubing: M, wall thickness, outside diam, in., 0.049 to 0.057, 1/4 to 1/2, \$1.21; 1/2 to 3/4, \$1.12; 3/4 to 1, 97c; 0.058 to 0.064, 1/2 to 3/4, 89c; 1/2 to 3/4, 81c; 0.065 to 0.082, 1/2 to 3/4, 76c; 3/4 to 1, 72c; 0.083 to 0.108, 1 to 2, 68c; 0.165 to 0.219, 2 to 3, 59c; 3 to 4, 57c. Other alloys higher.	

Nickel and Monel

(Cents per lb, f.o.b. mill)

	Nickel	Monel
Sheets, cold-rolled	54	43
No. 35 sheets	41	41
Strip, cold-rolled	60	44
Rod		
Hot-rolled	50	39
Cold-drawn	55	44
Angles, hot-rolled	50	39
Plates	52	41
Seamless tubes	83	71
Shot and blocks	37	31

Copper, Brass, Bronze

(Cents per pound, freight prepaid on 200 lb)

	Extruded		
	Shapes	Rods	Sheets
Copper	33.53	33.68	33.68
Copper, hot-rolled	30.03	30.03	30.03
Copper, drawn	31.03	31.03	31.03
Low brass	34.36*	31.39	31.70
Yellow brass	32.92*	29.85	30.16
Red brass	34.89*	31.92	32.23
Naval brass	30.28	29.03	34.97
Leaded brass	28.64	24.69	24.69
Commercial			
bronze	35.68*	32.96	33.27
Manganese bronze 33.87		32.37	33.47
Phosphor bronze,			
5 pct	53.95*	52.95	52.70
Muntz metal	29.80	28.55	32.99
Everdur, Herculoy,			
Olympic, etc. ..	37.24	37.50	38.56
Nickel silver,			
10 pct	41.80	42.68	40.54
5 pct	38.98	38.98	38.98
Architectural			
bronze	28.61	28.61	28.61
*Seamless tubing.			

Scrap Metals

Brass Mill Scrap

(Cents per pound; add 1c per lb for ship of 15,000 lb or more.)

	Heavy
Copper	19 1/2
Yellow brass	15 1/2
Red brass	17 1/2
Commercial bronze	17 1/2
Manganese bronze	15 1/2
Leaded brass rod ends....	15 1/2

Custom Smelters' Scrap

(Cents per pound, carload lots, delivered refinery.)

No. 1 copper, wire.....	18.75-19
No. 2 copper, wire.....	17.75-18
Light copper	16.75-17
Refinery brass	16.50-16
*Dry copper content.	

Ingot Makers' Scrap

(Cents per pound, carload lots, delivered producer.)

No. 1 copper, wire.....	18
No. 2 copper, wire	17
Light copper	16
No. 1 composition	15
No. 1 comp. turnings.....	14
Rolled brass	11
Brass pipe	12
Radiators	12
Heavy yellow brass	11

Aluminum

Mixed old cast	10
Mixed old clips	9
Mixed turnings	5
Pots & pans	10
Low copper	10.50-10

Dealers' Scrap

(Dealers' buying prices, f.o.b. New York in cents per pound.)

Copper and Brass

No. 1 heavy copper and wire..	16 1/2
No. 2 heavy copper and wire..	15 1/2
Light copper	14 1/2
Auto radiators (unsweated)...	10
No. 1 composition	12 1/2
No. 1 composition turnings....	12 1/2
Clean red car boxes.....	9 1/2
Cocks and Faucets	10
Mixed heavy yellow brass....	8
Old rolled brass	9 1/2
Brass pipe	10
New soft brass clippings.....	12 1/2
Brass rod ends	10
No. 1 brass rod turnings.....	9 1/2

Aluminum

Alum. pistons with struts....	4 1/2
Aluminum crankcases	7 1/2
2S aluminum clippings	9
Old sheet & utensils	7 1/2
Dry borings and turnings....	3
Misc. cast aluminum	7 1/2
Dural clips (24S)	7 1/2

Zinc

New zinc clippings	8
Old zinc	5 1/2
Zinc routings	3
Old die cast scrap.....	4

Nickel and Monel

Pure nickel clippings	16
Clean nickel turnings	12 1/2
Nickel anodes	16
Nickel rod ends	12
New Monel clippings	13
Clean Monel turnings	7
Old sheet Monel	10
Old Monel castings	7 1/2
Inconel clippings	8
Nickel silver clippings, mixed	8
Nickel silver turnings, mixed	6 1/2

Lead

Soft scrap lead	14 1/2
Battery plates (dry)	9

Magnesium Alloys

Segregated solids	7 1/2
Castings	4 1/2

Miscellaneous

Block tin	75
No. 1 pewter	60
No. 1 auto babbitt	45
Mixed common babbitt	14 1/2
Solder joints	17 1/2
Siphon tops	45
Small foundry type	17 1/2
Monotype	16 1/2
Lino. and stereotype	15 1/2
Electrotype	12 1/2
New type shell cuttings....	14 1/2
Hand picked type shells....	6 1/2
Lino and stereo dross.....	8
Electro dross	6

Comparison of Prices . .

Advances over past week in Heavy Type, declines in *Italics*. Prices are f.o.b. major basing points. The various basing points for finished and semifinished steel are listed in the detailed price tables.

Hot-Rolled Steel:	May 4, 1948	Apr. 27, 1948	Apr. 6, 1948	May 6, 1947
(cents per pound)	1948	1948	1948	1947
Hot-rolled sheets	2.75	2.80	2.80	2.50
Cold-rolled sheets	3.45	3.55	3.55	3.20
Galvanized sheets (10 ga.)	3.85	3.95	3.95	3.55
Hot-rolled strip	2.75	2.80	2.80	2.50
Cold-rolled strip	3.55	3.55	3.55	3.20
Plates	2.90	2.95	2.95	2.65
Plates wrought iron	7.25	7.25	7.25	5.95
Stain's c-r strip (No. 302)	30.50	30.50	30.50	30.50

in and Terneplate:	May 4, 1948	Apr. 27, 1948	Apr. 6, 1948	May 6, 1947
(dollars per base box)				
Finplate (1.50 lb) cokes..	\$6.70	\$6.80	\$6.80	\$5.75
Finplate, electro (0.50 lb)	5.90	6.00	6.00	5.05
Special coated mfg. ternes	5.80	5.90	5.90	4.90

Bars and Shapes:	May 4, 1948	Apr. 27, 1948	Apr. 6, 1948	May 6, 1947
(cents per pound)				
Merchant bars	2.85	2.90	2.90	2.60
Cold-finished brs	3.45	3.55	3.55	3.20
Alloy bars	3.20	3.30	3.30	3.05
Structural shapes	2.75	2.80	2.80	2.50
Stainless bars (No. 302)	26.00	26.00	26.00	26.00
Wrought iron bars	8.65	8.65	8.65	6.15

Wire:	May 4, 1948	Apr. 27, 1948	Apr. 6, 1948	May 6, 1947
(cents per pound)				
Bright wire	3.55	3.55	3.55	3.30

Rails:	May 4, 1948	Apr. 27, 1948	Apr. 6, 1948	May 6, 1947
(dollars per 100 lb)				
Heavy rails	\$2.70	\$2.75	\$2.75	\$2.50
Light rails	3.05	3.10	3.10	2.85

Semifinished Steel:	May 4, 1948	Apr. 27, 1948	Apr. 6, 1948	May 6, 1947
(dollars per gross ton)				
Rerolling billets	\$45.00†	\$45.00†	\$45.00†	\$42.00
Slabs, rerolling	45.00†	45.00†	45.00†	42.00
Forging billets	54.00†	54.00†	54.00†	50.00
Alloy blooms, billets, slabs	66.00	66.00	66.00	61.00

Wire Rods and Skelp:	May 4, 1948	Apr. 27, 1948	Apr. 6, 1948	May 6, 1947
(cents per pound)				
Wire rods	2.80	2.80	2.80	2.55
Skelp	2.90	2.90	2.90	2.35
Net ton				

Pig Iron:	May 4, 1948	Apr. 27, 1948	Apr. 6, 1948	May 6, 1947
(per gross ton)				
No. 2, foundry, Phila....	\$44.61	\$44.61	\$44.61	\$36.51
No. 2, Valley furnace....	39.50	39.50	39.50	33.50
No. 2, Southern Cin'ti....	43.28	43.28	43.28	34.75
No. 2, Birmingham.....	37.38	37.38	37.38	29.88
No. 2, foundry, Chicago†	39.00	39.00	39.00	33.00
Basic del'd Philadelphia..	44.11	44.11	44.11	36.92
Basic, Valley furnace....	39.00	39.00	39.00	33.00
Malleable, Chicago†	39.50	39.50	39.50	33.50
Malleable, Valley	39.50	39.50	39.50	33.50
Charcoal, Chicago	62.46	62.46	62.46	45.99
Ferromanganese‡	145.00	145.00	145.00	135.00

† The switching charge for delivery to foundries in the Chicago district is \$1 per ton.
‡ For carlots at seaboard.

Scrap:	May 4, 1948	Apr. 27, 1948	Apr. 6, 1948	May 6, 1947
(per gross ton)				
Heavy melt'g steel, P'gh..	\$40.25	\$40.25	\$40.25	\$29.75
Heavy melt'g steel, Phila.	41.75	41.50	41.50	29.75
Heavy melt'g steel, Ch'go	39.25	39.25	39.00	29.75
No. 1, hy, comp. sh't, Det.	35.50	35.50	35.50	24.75
Low phos. Young'n.....	45.25	45.25	45.25	36.25
No. 1, cast, Pittsburgh...	64.00	64.00	64.00	41.50
No. 1, cast, Philadelphia..	65.50	65.50	65.50	44.50
No. 1, cast, Chicago.....	71.50	74.00	70.50	39.50

Coke, Connellsville:	May 4, 1948	Apr. 27, 1948	Apr. 6, 1948	May 6, 1947
(per net ton at oven)				
Furnace coke, prompt...	\$12.50	\$12.50	\$12.50	\$10.50
Foundry coke, prompt...	14.00	14.00	14.00	11.25

Nonferrous Metals:	May 4, 1948	Apr. 27, 1948	Apr. 6, 1948	May 6, 1947
(cents per pound to large buyers)				
Copper, electro, Conn....	21.50	21.50	21.50	21.50
Copper, Lake Conn.	21.625	21.625	21.625	21.625
Tin, Grade A, New York	94.00	94.00	94.00	80.00
Zinc, East St. Louis.....	12.00	12.00	12.00	10.50
Lead, St. Louis.....	17.30	17.30	17.30	14.80
Aluminum, virgin	15.00	15.00	15.00	15.00
Nickel, electrolytic	36.56	36.56	36.56	37.67
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex...	33.00	33.00	33.00	33.00

Starting with the issue of Apr. 22, 1943, the weighted finished steel index was revised for the years 1941, 1942, and 1943. See explanation of the change on p. 90 of the Apr. 22, 1943, issue. Index revised to a quarterly basis as of Nov. 16, 1944; for details see p. 98 of that issue. The finished steel composite price for the current quarter is an estimate based on finished steel shipments for the previous quarter. This figure will be revised when shipments for this quarter are compiled.

Composite Prices . .

FINISHED STEEL (Base Price)	May 4, 1948	Apr. 27, 1948	Apr. 6, 1948	May 6, 1947
one week ago	3.18422¢	3.18422¢	3.18422¢	2.86354¢
one month ago	3.23940¢	3.23940¢	3.23940¢	2.86354¢
one year ago	3.23940¢	3.23940¢	3.23940¢	2.86354¢

HIGH	LOW	HIGH	LOW
948.... 3.23940¢ Feb. 17	3.18422¢ May 4	40.37 Feb. 17	39.58 Jan. 6
947.... 3.19541¢ Oct. 7	2.87118¢ Jan. 7	37.98 Dec. 30	30.14 Jan. 7
946.... 2.83599¢ Dec. 31	2.54490¢ Jan. 1	30.14 Dec. 10	25.37 Jan. 1
945.... 2.44104¢ Oct. 2	2.38444¢ Jan. 2	25.37 Oct. 23	23.61 Jan. 2
944.... 2.30837¢ Sept. 5	2.21189¢ Oct. 5	\$23.61	\$23.61
943.... 2.29176¢	2.29176¢	23.61	23.61
942.... 2.28249¢	2.28249¢	23.61	23.61
941.... 2.43078¢	2.43078¢	\$23.61 Mar. 20	\$23.45 Jan. 2
940.... 2.30467¢ Jan. 2	2.24107¢ Apr. 16	23.45 Dec. 23	22.61 Jan. 2
939.... 2.35367¢ Jan. 3	2.26689¢ May 16	22.61 Sept. 19	20.61 Sept. 12
938.... 2.58414¢ Jan. 4	2.27207¢ Oct. 18	23.25 June 21	19.61 July 6
937.... 2.58414¢ Mar. 9	2.32263¢ Jan. 4	23.25 Mar. 9	20.25 Feb. 16
936.... 2.32263¢ Dec. 28	2.05200¢ Mar. 10	19.74 Nov. 24	18.73 Aug. 11
935.... 2.07642¢ Oct. 1	2.06492¢ Jan. 8	18.84 Nov. 5	17.83 May 14
934.... 2.15367¢ Apr. 24	1.95757¢ Jan. 2	17.90 May 1	16.90 Jan. 27
933.... 1.95578¢ Oct. 3	1.75836¢ May 2	16.90 Dec. 5	13.56 Jan. 3
932.... 1.89196¢ July 5	1.83901¢ Mar. 1	14.81 Jan. 5	13.56 Dec. 6
931.... 1.99626¢ Jan. 13	1.86586¢ Dec. 29	15.90 Jan. 6	14.79 Dec. 15
930.... 2.25488¢ Jan. 7	1.97319¢ Dec. 9	18.21 Jan. 7	15.90 Dec. 16
929.... 2.31773¢ May 28	2.26498¢ Oct. 29	18.71 May 14	18.21 Dec. 17

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing major portion of finished steel shipments. Index recapitulated in Aug. 28, 1941, issue.

PIG IRON	May 4, 1948	Apr. 27, 1948	Apr. 6, 1948	May 6, 1947
per gross ton	\$40.11	\$40.11	\$40.11	\$33.15

HIGH	LOW	HIGH	LOW
40.37 Feb. 17	39.58 Jan. 6	41.83 Jan. 29	39.75 Mar. 9
37.98 Dec. 30	30.14 Jan. 7	42.58 Oct. 28	29.50 May 20
30.14 Dec. 10	25.37 Jan. 1	31.17 Dec. 24	19.17 Jan. 1
25.37 Oct. 23	23.61 Jan. 2	19.17 Jan. 2	18.92 May 22
\$23.61	\$23.61	19.17 Jan. 11	15.76 Oct. 24
23.61	23.61	\$19.17	\$19.17
23.61	23.61	19.17	19.17
\$23.61 Mar. 20	\$23.45 Jan. 2	\$22.00 Jan. 7	\$19.17 Apr. 10
23.45 Dec. 23	22.61 Jan. 2	21.83 Dec. 30	16.04 Apr. 9
22.61 Sept. 19	20.61 Sept. 12	22.50 Oct. 3	14.08 May 16
23.25 June 21	19.61 July 6	15.00 Nov. 22	11.00 June 7
23.25 Mar. 9	20.25 Feb. 16	21.92 Mar. 30	12.67 June 9
19.74 Nov. 24	18.73 Aug. 11	17.75 Dec. 21	12.67 June 8
18.84 Nov. 5	17.83 May 14	13.42 Dec. 10	10.33 Apr. 29
17.90 May 1	16.90 Jan. 27	13.00 Mar. 13	9.50 Sept. 25
16.90 Dec. 5	13.56 Jan. 3	12.25 Aug. 8	6.75 Jan. 3
14.81 Jan. 5	13.56 Dec. 6	8.50 Jan. 12	6.43 July 5
15.90 Jan. 6	14.79 Dec. 15	11.33 Jan. 6	8.50 Dec. 29
18.21 Jan. 7	15.90 Dec. 16	15.00 Feb. 18	11.25 Dec. 9
18.71 May 14	18.21 Dec. 17	17.58 Jan. 29	14.08 Dec. 8

Based on averages for basic iron at valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

SCRAP STEEL	May 4, 1948	Apr. 27, 1948	Apr. 6, 1948	May 6, 1947
per gross ton	\$40.42	\$40.33	\$40.25	\$29.75

HIGH	LOW	HIGH	LOW
41.83 Jan. 29	39.75 Mar. 9	42.58 Oct. 28	29.50 May 20
42.58 Oct. 28	29.50 May 20	31.17 Dec. 24	19.17 Jan. 1
31.17 Dec. 24	18.92 May 22	19.17 Jan. 2	15.76 Oct. 24
19.17 Jan. 11	15.76 Oct. 24	\$19.17	\$19.17
\$19.17	\$19.17	19.17	19.17
\$22.00 Jan. 7	\$19.17 Apr. 10	21.83 Dec. 30	16.04 Apr. 9
21.83 Dec. 30	16.04 Apr. 9	22.50 Oct. 3	14.08 May 16
15.00 Nov. 22	11.00 June 7	21.92 Mar. 30	12.67 June 9
21.92 Mar. 30	12.67 June 9	17.75 Dec. 21	12.67 June 8
17.75 Dec. 21	10.33 Apr. 29	13.42 Dec. 10	9.50 Sept. 25
13.42 Dec. 10	8.50 Jan. 12	13.00 Mar. 13	6.75 Jan. 3
12.25 Aug. 8	6.43 July 5	12.25 Aug. 8	6.75 Jan. 3
8.50 Jan. 12	8.50 Dec. 29	8.50 Jan. 12	6.43 July 5
11.33 Jan. 6	11.25 Dec. 9	11.33 Jan. 6	8.50 Dec. 29
15.00 Feb. 18	14.08 Dec. 8	15.00 Feb. 18	11.25 Dec. 9
17.58 Jan. 29		17.58 Jan. 29	14.08 Dec. 8

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

Iron and Steel Prices . . .

Steel prices shown here are f.o.b. basing points in cents per pound or dollars per gross ton unless otherwise indicated. Extras apply. Delivered prices do not reflect 3 pct tax on freight. Industry practice has discontinued arbitrary f.o.b. prices at Gulf and Pacific Ports. Space limitations prevent quotation of delivered prices at major ports. (1) Commercial quality sheet grade; primes, 0.25¢ above base. (2) Commercial quality grade. (3) Widths up to 12-in. inclusive. (4) 0.25 carbon and less. (5) Cokes, 1.25 lb, deduct 20¢ per base box. (6) For merchant trade. (7) For straight length material only from producers to fabricators. (8) Also shafting. For quantities of 40,000 lb & over. (9) Carload lot in manufacturing trade. (10) Delivered Los Angeles only. (11) Hollowware enameling, gages 29 to 81 only. (12) Produced to dimensional tolerances in AISI Manual Sec. 6. (13) Delivered San Francisco only. (14) Kaiser Co. prices (15) from 0.035 to 0.075 in. thick by ¼ to ¾ in. wide. (16) Delivered Los Angeles; add 0.55¢ per 100 lb for San Francisco. (17) Slab prices subject to negotiation in most cases. Some producers charge (18) \$2 more. (19) \$1 per ton more. NOTE—Due to uncertain price structure at press time U. S. Steel Corp. subsidiary prices are inserted below at applicable basing points, without switching charges. Other producers may charge the same or more at these points.

Basing Points	Pitts- burgh	Chicago	Gary	Cleve- land	Birm- ingham	Buffalo	Youngs- town	Spar- rows Point	Granite City	Middle- town, Ohio	San Francisco, Los Angeles, Seattle	DELIVERED TO			
												Detroit	New York	Phila- delphia	
INGOTS															
Carbon, rerolling															
		(Spot market as high as \$75 to \$90 gross ton)													
Carbon, forging	\$46.00	(per net ton)													
Alloy	\$56.00										(Canton = \$56.00)				
BILLETS, BLOOMS, SLABS															
Carbon, rerolling ¹⁷	\$45.00 ¹⁸	\$45.00 ¹⁸	\$45.00 ¹⁸	\$47.00	\$45.00 ¹⁸	\$45.00 ¹⁸	(per net ton)								
Carbon forg'ng billets	\$54.00	\$54.00	\$54.00	\$54.00	\$54.00	\$54.00	(per net ton)								
Alloy	\$66.00	\$66.00				\$66.00					(Bethlehem, Massillon, Canton = \$66.00)				
SHEET BARS											Subject to negotiation				
PIPE SKELP	2.90¢						2.90¢								
WIRE RODS	2.80¢ ¹⁹	2.80¢		2.80¢	2.85¢							3.52¢ ¹⁸			
SHEETS															
Hot-rolled	2.75¢	2.75¢	2.75¢	2.80¢	2.75¢	2.80¢	2.75¢	2.80¢			(Ashland, Ky. = 2.80¢)	3.49¢ ¹⁶	3.01¢	3.14¢	3.040¢
Cold-rolled ¹	3.45¢	3.45¢	3.45¢	3.55¢		3.55¢	3.55¢		3.65¢	3.55¢			3.76¢	4.00¢	4.008¢
Galvanized (10 gage)	3.85¢	3.95¢	3.85¢		3.85¢		3.95¢	3.95¢	4.05¢	3.95¢	(Ashland = 3.95¢)	4.62¢ ¹⁶		4.29¢	4.190¢
Enameling (12 gage)	3.85¢	3.75¢	3.85¢	3.95¢			3.95¢		4.05¢	3.95¢			4.16¢	4.46¢	4.406¢
Long ternes ² (10 gage)	4.05¢		4.05¢											4.56¢	4.506¢
STRIP															
Hot-rolled ³	2.80¢	2.75¢	2.75¢	2.75¢ ¹⁶	2.75¢		2.75¢					3.55¢ ¹⁶	3.01¢	3.31¢	3.256¢
Cold-rolled ⁴	3.55¢	3.55		3.45¢			3.55¢				(Worcester = 3.65¢)		3.78¢	4.06¢	4.006¢
Cooperage stock	3.10¢	3.10¢			3.10¢		3.10¢							3.61¢	
TIN PLATE															
Cokes, 1.50 lb ⁵ , base box	\$6.70	\$6.70	\$6.70		\$6.80			\$6.90	\$6.90		(Warren, Ohio = \$6.80)		\$7.24¢	\$7.140	
(0.25 lb Electro, box 0.50 lb 0.75 lb															
TERNES, MFG., special coated															
BLACKPLATE, CANMAKING															
55 lb to 70 lb 75 lb to 115 lb 100 lb to 128 lb															
BLACKPLATE, h. e. 29 ga ¹¹	4.65¢	4.65¢	4.65¢					4.65¢	4.65¢					5.19¢	5.090¢
BARS															
Carbon steel	2.85¢	2.85¢	2.85¢	2.90¢	2.90¢	2.85¢	2.85¢				3.57¢ ¹⁶	3.11¢	3.35¢	3.356¢	
Rail steel ⁶															
Reinforcing (billet) ⁷	2.70¢	2.70¢	2.70¢	2.75¢	2.70¢	2.75¢	2.75¢	2.75¢			3.32¢ ¹⁶		3.09¢	2.990¢	
Reinforcing (rail)															
Cold-finished ⁸	3.45¢	3.45¢		3.45¢		3.55¢							3.71¢	4.00¢	4.006¢
Alloy, hot-rolled	3.20¢	3.20¢	3.20¢			3.30¢	3.20¢			(Bethlehem, Massillon, Canton = 3.30¢)			3.51¢		3.432¢
Alloy, cold-drawn	4.10¢	4.10¢	4.10¢	4.10¢		4.10¢				(Canton = 4.10¢)					
PLATE															
Carbon Steel ¹²	2.90¢	2.90¢	2.90¢	2.95¢	2.90¢		2.90¢			(Coatesville = 3.45¢, Claymont = 3.65¢, Geneva, Utah = 2.90¢)			3.29¢		3.190¢
Floor plates	4.05¢	4.05¢		4.20¢							3.83¢ ¹⁴			4.71¢	4.656¢
Alloy	3.70¢	3.70¢	3.70¢			(Coatesville = 4.80¢)								4.31¢	4.256¢
SHAPES, Structural	2.75¢	2.75¢	2.75¢		2.75¢	2.80¢				(Geneva, Utah = 2.75¢, Bethlehem = 2.80¢)		3.42¢ ¹⁶		3.040¢	2.932¢
SPRING STEEL, C-R															
0.08 to 0.40 carbon	3.55¢			3.55¢						(Worcester = 3.75¢)					
0.41 to 0.60 carbon	5.05¢			5.05¢						(Worcester = 5.25¢)					
0.61 to 0.80 carbon	5.65¢			5.65¢						(Worcester = 5.85¢)					
0.81 to 1.05 carbon	7.15¢			7.15¢						(Worcester = 7.35¢)					
1.06 to 1.35 carbon	9.45¢			9.45¢						(Worcester = 9.65¢)					
MANUFACTURERS' WIRE															
Bright	3.55¢	3.55¢		3.55¢	3.55¢					(Worcester = 3.65¢, Duluth = 3.60¢)		4.56¢ ¹³		4.022¢	4.006¢
Galvanized															
Spring (high carbon)	4.60¢	4.60¢		4.60¢						(Worcester = 4.70¢, Duluth = 4.85¢) (Trenton = 4.85¢)		5.73¢ ¹³		5.072¢	4.964¢
PILING, Steel sheet	3.30¢	3.30¢				3.30¢								3.75¢	3.756¢

CORROSION AND HEAT RESISTANT STEELS

In cents per pound, f.o.b. basing point

Basing Point	Chromium Nickel		Straight Chromium			
	No. 304	No. 302	No. 410	No. 430	No. 442	No. 446
Ingots, P'gh, Chi, Canton, Balt, Reading, Ft. Wayne, Phila.....	Subject to negotiation			Subject to negotiation		
Blooms, P'gh, Chi, Canton, Phila, Reading, Ft. Wayne, Balt.....	Subject to negotiation			Subject to negotiation		
Slabs, P'gh, Chi, Canton, Balt, Phila, Reading.....	Subject to negotiation			Subject to negotiation		
Billets, P'gh, Chi, Canton, Watervliet, Syracuse, Balt, Beth.....	Subject to negotiation			Subject to negotiation		
Billets, forging, P'gh, Chi, Canton, Dunkirk, Balt, Phila, Reading, Water, Syracuse, Ft. Wayne, Titusville, Beth, Brackenridge.....	23.00	22.50	17.50	17.50	21.00	25.50
Bars, h-r, P'gh, Chi, Canton, Dunkirk, Watervliet, Syracuse, Balt, Phila, Reading, Ft. Wayne, Titusville, Beth, Brackenridge.....	27.50	26.00	20.50	21.00	24.50	30.00
Bars, c-f, P'gh, Chi, Cleve, Canton, Dunkirk, Syracuse, Balt, Phila, Reading, Ft. Wayne, Watervliet, Beth, Brackenridge.....	27.50	26.00	20.50	21.00	24.50	30.00
Plates, P'gh, Middletown, Canton, Brackenridge, Balt, Coatesville.....	31.50	29.50	23.50	24.00	28.00	33.00
Shapes, structural, P'gh, Chi, Brackenridge.....	27.50	26.00	20.50	21.00	24.50	30.00
Sheets, P'gh, Chi, Middletown, Canton, Balt, Brackenridge.....	39.00	37.00	29.00	31.50	35.50	39.50
Strip, h-r, P'gh, Chi, Reading, Canton, Youngstown.....	25.50	23.50	18.50	19.00	26.00	30.00
Strip, c-r, P'gh, Cleve, Jersey City, Reading, Canton, Youngstown, Balt, W. Leechburg.....	32.50	30.50	24.00	24.50	35.00	38.50
Wire, c-d, Cleve, Dunkirk, Syracuse, Balt, Reading, Canton, P'gh, Newark, N. J., Phila, Ft. Wayne, Brackenridge.....	27.50	26.00	20.50	21.00	24.50	30.00
Wire, flat, c-r, Cleve, Balt, Reading, Dunkirk, Canton, W. Leechburg.....	32.48	30.30	23.80	24.34	34.62	38.28
Rod, h-r, Syracuse.....	27.05	25.97	20.02	20.58	24.34	28.75
Tubing, seamless, P'gh, Chi, Canton, Brackenridge, Milwaukee.....	72.09	72.09	.....	68.49	.....	.....

TOOL STEEL

F.o.b. Pittsburgh, Bethlehem, Syracuse, Dunkirk. *Also Canton, Ohio)

W	Cr	V	Mo	Co	Base per lb
18	4	1	—	—	\$24
18	4	1	—	5	\$1.29
18	4	2	—	—	93¢
1.5	4	1.5	8	—	59¢
6	4	2	6	—	63¢
High-carbon-chromium*					47¢
Oil hardening manganese*					26¢
Special carbon*					24¢
Extra carbon*					20¢
Regular carbon*					17¢

Warehouse prices on and east of Mississippi are 2¢ per lb higher; west of Mississippi, 4¢ higher.

ELECTRICAL SHEETS

Base, all grades f.o.b. Pittsburgh

	Per lb
Armature	4.70¢ to 5.05¢
Electrical	5.20¢ to 5.45¢
Motor	5.95¢ to 6.30¢
Dynamo	6.65¢ to 7.50¢
Transformer 72	7.15¢ to 8.25¢
Transformer 65	7.85¢ to 9.20¢
Transformer 58	8.55¢ to 9.90¢
Transformer 52	9.35¢ to 9.70¢

F.o.b. Chicago and Gary; armature through motor only. F.o.b. Granite City add to lower quotation 0.55¢ for armature through and including 72, and 0.45¢ for balance.

RAILS, TRACK SUPPLIES

(F.o.b. mill)

Standard rails, heavier than 60 lb No. 1 O.H., per 100 lb.....	\$2.70
Angle splice bars, 100 lb.....	3.75
Light rails (from billets) per 100 lb.....	3.05

Base per lb

Cut spikes	4.85¢
Screw spikes	6.90¢
Die plate, steel	3.55¢
Die plates, Pittsburgh, Calif.....	3.70¢
Track bolts	7.00¢
Track bolts, heat treated, to rail-roads	7.25¢

ROOFING TERNEPLATE

(F.o.b. Pittsburgh, 112 sheets)

20x14 in. 20x28 in.

8-lb coating I.C. \$7.05 \$14.10

CLAD STEEL

Base prices, cents per pound

Stainless-clad		Plate	Sheet
No. 304, 20 pct, f.o.b. Pittsburgh, Washing- ton, Coatesville, Pa....		\$24.00	\$22.00
Nickel-clad			
10 pct, f.o.b. Coatesville, Pa.		21.50	....
Inconel-clad			
10 pct, f.o.b. Coatesville..		30.00	....
Monel-clad			
10 pct, f.o.b. Coatesville..		24.00	....
Aluminized steel			
Hot dip, 20 gage, f.o.b. Pittsburgh .....		....	9.00

* Includes annealing and pickling, or sandblasting.

MERCHANT WIRE PRODUCTS

To the dealer, f.o.b. Pittsburgh, Chicago, Birmingham

	Base Column	San Francisco
Standard & coated nails*	91	112
Galvanized nails*	91	112
Woven wire fence.....	97	120
Fence posts, carloads†..	102	...
Single loop bale ties....	94	118
Galvanized barbed wire**	111	131
Twisted barbless wire..	111	...

* Also Duluth; Worcester, 6 columns higher. † 15 1/2 gage and heavier. ** On 80-rod spools, in carloads. †† Pittsburgh, Duluth only.

	Base per 100 lb	San Francisco
Annealed fence wire†..	\$4.10	\$5.11
Annealed, galv. fencing†	4.50	5.56
Cut nails, carloads ††..	6.30	...

† Add 10¢ at Worcester. †† Pittsburgh only, less 20¢ to jobbers.

HIGH STRENGTH, LOW ALLOY STEELS

base prices, cents per pound

Steel	Aldo- cor	Corten	Double Strength No. 1	Dyn- alloy	Hi Steel	Mayar- R	Ona- coloy	Yoloy	NAX High Tensile
Producer	Repub- lic	Carnegie- Illinois, Republic	Repub- lic	Alan Wood	Inland	Bethle- hem	Jones & Laughlin	Youngs- town Sheet & Tube	Great Lakes Steel
Plates.....	4.55	4.45	4.55	4.55	4.45	4.55	4.55	4.55	4.55
Sheets									
Hot-rolled ...	4.30	4.20	4.30	4.30	4.20	4.30	4.30	4.30	4.30
Cold-rolled ...	5.30	5.20	5.30	....	5.20	5.30	5.30	5.30	5.30
Galvanized...	....	5.90	....	....	5.90	6.00	....	....	....
Strip									
Hot-rolled ...	4.30	4.20	4.30	....	4.20	4.30	4.30	4.30	4.30
Cold-rolled...	....	....	5.20	....	....	5.30	5.30	5.30	5.30†
Shapes.....	....	4.20	....	....	4.20	4.30	4.30	4.30	....
Beams.....	....	4.20	....	....	4.20	4.30	....	....	....
Bars									
Hot-rolled ...	4.45	4.35	4.45	....	4.35	4.45	4.45	4.45	4.45
Bar shapes.....	....	4.35	....	....	4.35	4.45	4.45	4.45	....

† Pittsburgh, add 0.10¢ at Chicago and Gary.

PIPE AND TUBING

Base discounts, f.o.b. Pittsburgh and Lorain, steel butt-weld and seamless. Others f.o.b. Pittsburgh per net ton. Base price, \$200.00 per net ton. At Lorain, 1 point higher discount (lower price) on steel butt-weld only.

Standard, threaded & coupled

Steel, butt-weld	Black	Galv.
1/2-in.	47	29 1/2
3/4-in.	50	33 1/2
1-in.	52 1/2	36 1/2
1 1/4-in.	53	37
1 1/2-in.	53 1/2	37 1/2
2-in.	54	38
2 1/2 and 3-in.	54 1/2	38 1/2

Wrought iron, butt-weld

1/2-in.	+11	+35
3/4-in.	+1 1/2	+25
1 and 1 1/4-in.	4	+16 1/2
1 1/2-in.	9 1/2	+13
2-in.	10	+12 1/2

Steel, lap-weld

2-in.	44 1/2	28
2 1/2 and 3-in.	48 1/2	32
3 1/2 to 6-in.	50 1/2	34

Steel, seamless

2-in.	43 1/2	27
2 1/2 and 3-in.	46 1/2	30
3 1/2 to 6-in.	48 1/2	32

Wrought iron, lap-weld

2-in.	1 1/2	+20
2 1/2 to 3 1/2-in.	4	+16
4-in.	8	+10 1/2
4 1/2 to 8-in.	6	+12

Extra Strong, plain ends

Steel, butt-weld	Black	Galv.
1/2-in.	46	30
3/4-in.	50	34
1-in.	52	37
1 1/4-in.	52 1/2	37 1/2
1 1/2-in.	53	38
2-in.	53 1/2	38 1/2
2 1/2 and 3-in.	54	39

Wrought iron, butt-weld

1/2-in.	+6 1/2	+29
3/4-in.	+4 1/2	+23
1 and 1 1/4-in.	4	+16 1/2
2-in.	10	+12 1/2

Steel, lap-weld

2-in.	43 1/2	28
2 1/2 and 3-in.	48 1/2	33
3 1/2 to 6-in.	52	36 1/2

Steel, seamless

2-in.	42 1/2	27
2 1/2 and 3-in.	46 1/2	31
3 1/2 to 6-in.	50	34 1/2

Wrought iron, lap-weld

2-in.	4 1/2	+16 1/2
2 1/2 to 4-in.	13	+6
4 1/2 to 6-in.	9	+10 1/2

Basing discounts for standard pipe are for threads and couplings. For threads only, butt-weld, lap-weld and seamless pipe, one point higher discount (lower price) applies. For plain ends, butt-weld, lap-weld and seamless pipe 3-in. and smaller, three points higher discount (lower price) applies, while for lap-weld and seamless 3 1/2-in. and larger four points higher discount (lower price) applies. F.o.b. Gary prices are one point lower discount on all butt-weld. On butt-weld and lap-weld steel pipe, jobbers are granted a discount of 5 pct. On L.L. shipments, prices are determined by adding 25 pct and 30 pct and the carload freight rate to the base card.

BOILER TUBES

Seamless steel and electric welded commercial boiler tubes and locomotive tubes, minimum wall. Net base prices per 100 ft, f.o.b. Pittsburgh in carload lots, out length 4 to 24 ft, inclusive.

OD in.	Gage	Hot-Rolled	Seamless Cold-Drawn	Electric Welded Hot-Rolled	Electric Welded Cold-Drawn
2	13	\$17.84	\$20.99	\$17.30	\$20.36
2 1/2	12	25.99	28.21	23.27	27.36
3	12	26.68	31.40	25.88	30.46
3 1/2	11	35.35	39.26	32.35	38.08
4	10	41.40	48.70	40.16	47.24

CAST IRON WATER PIPE

Per net ton
 8-in. to 24-in. del'd Chicago\$31.12
 6-in. to 24-in. del'd New York 89.18
 4-in. to 24-in., Birmingham 79.50
 6-in. and larger, f.o.b. cars San Francisco, Los Angeles for all rail shipment; rail and water shipment less 105.90
 Class "A" and gas pipe, \$5 extra: 4-in. pipe is \$5 a ton above 6-in.

BOLTS, NUTS, RIVETS, SET SCREWS

Consumer Prices

(Bolts and nuts f.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Base discount less case lots

Machine and Carriage Bolts

Percent Off List

1/2 in. & smaller x 6 in. & shorter...	45
9/16 & 5/8 in. x 6 in. & shorter.....	46
3/4 in. & larger x 6 in. & shorter.....	43
All diam, longer than 6 in.	41
Lag, all diam over 6 in. long.....	44
Lag, all diam x 6 in. & shorter.....	46
Plow bolts	54

Nuts, Cold Punched or Hot Pressed

(Hexagon or Square)

1/2 in. and smaller	43
9/16 to 1 in. inclusive	42
1 1/4 to 1 1/2 in. inclusive	40
1 1/2 in. and larger	35

On above bolts and nuts, excepting plow bolts, additional allowance of 15 pct for full container quantities. There is an additional 5 pct allowance for carload shipments.

Semifin. Hexagon Nuts

USS SAE

7/16 in. and smaller	46
1/2 in. and smaller	44
1/2 in. through 1 in.	44
9/16 in. through 1 in.	43
1 1/4 in. through 1 1/2 in.	41
1 1/2 in. and larger	35

In full case lots, 15 pct additional discount. For 200 lb or more, freight allowed up to 50¢ per 100 lb, based on Cleveland, Chicago, Pittsburgh.

Stove Bolts

Packages, nuts separate65 and 10
 In bulk 75 |

On stove bolts freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago, New York on lots of 200 lb or over.

Large Rivets

(1/2 in. and larger)

Base per 100 lb

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	\$5.65
F.o.b. Lebanon, Pa.	5.80

Small Rivets

(7/16 in. and smaller)

Percent Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	55
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Cap and Set Screws

(In packages)

Percent Off List

Hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in., SAE 1030, bright	53
1/2 to 1 in. x 6 in., SAE 1035, heat treated	44
Set screws, oval points	57
Milled studs	29
Flat head cap screws, listed sizes...	16
Fillister head cap, listed sizes	37
Freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago or New York on lots of 200 lb or over.	

FLUORSPAR

Metallurgical grade, f.o.b. producing plant.

Effective CaF ₂ Content:	Base price per short ton
70% or more	\$35.00
65% but less than 70%	34.00
60% but less than 65%	33.00
Less than 60%	32.00

LAKE SUPERIOR ORES

(51.50% Fe, Natural Content, Delivered Lower Lake Ports)

Per Gross Ton

Old range, bessemer.....	\$6.60
Old range, nonbessemer.....	6.45
Mesabi, bessemer	6.35
Mesabi, nonbessemer	6.20
High phosphorus	6.20

Increases or decreases in freight rates, dock handling charges and taxes after Apr. 1, 1948, are to be added to above prices.

METAL POWDER

Per pound, f.o.b. shipping point, in ton lots for minus 100 mesh.

Swedish sponge iron c.i.f. New York, ocean bags.....	7.9¢ to 9.0¢
Domestic sponge iron, 98+% Fe	9.5¢ to 16.0¢
Electrolytic iron, annealed, 99.5+% Fe	19.5¢ to 39.0¢
Electrolytic iron, unannealed, minus 325 mesh, 98+% Fe	44.0¢
Hydrogen reduced iron, minus 300 mesh, 98+% Fe.....	63.0¢ to 80.0¢
Carbonyl iron, minus 300 mesh, 98%, 99.8+% Fe.....	90.0¢ to \$1.75
Aluminum	24.0¢ to 28.5¢
Nickel	30.62¢
Copper, electrolytic	30.5¢
Copper, reduced	\$2.40
Cadmium	\$3.50
Chromium, electrolytic, 99% min.	24.0¢
Lead	50.0¢
Manganese	\$2.00
Molybdenum, 99%	51.5¢
Nickel, unannealed	53.0¢
Nickel, spherical, minus 30 mesh	29.0¢
Silicon	8.5¢ plus metal cost
Solder powder	302.....
Stainless steel, 302.....	\$1.01
Tin	\$2.90
Tungsten, 98%, 99%.....	

COKE

Furnace, beehive (f.o.b. oven) Net Ton	
Connellsville, Pa.	\$12.00 to \$13.00
Foundry, beehive (f.o.b. oven)	
Connellsville, Pa.	13.50 to 14.50
Foundry, Byproduct	
Chicago, del'd	\$18.60
Chicago, f.o.b.	17.50
New England, del'd	20.40
Seaboard, Kearney, N. J., f.o.b.	17.85
Philadelphia, f.o.b.	17.75
Swedeland, Pa., f.o.b.	17.75
Buffalo, del'd	20.15
Ashland, Ohio, f.o.b.	15.50
Painesville, Ohio, f.o.b.	16.60
Erie, del'd	19.95
Cleveland, del'd	17.90
Cincinnati, del'd	18.59
St. Louis, del'd	18.03
Birmingham, del'd	15.76

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick	Carloads, Per 1000
No. 1 Ohio	\$67.00
First quality, Pa., Md., Ky., Mo., Ohio	73.00
First quality, New Jersey	78.00
Sec. quality, Pa., Md., Ky., Mo., Ohio	67.00
Sec. quality, New Jersey	70.00
No. 2 Ohio	59.00
Ground fire clay, net ton, bulk	10.50

Silica Brick

Pennsylvania and Birmingham	\$73.00
Chicago District and Alabama	82.00
Silica cement, net ton (Eastern) ..	12.50
East Chicago	13.50

Chrome Brick

Per Net Ton

Standard chemically bonded, Balt., Plymouth Meeting, Chester	\$64.00
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Magnesite Brick

Standard, Balt. and Chester	\$86.00
Chemically bonded, Baltimore	75.00

Grain Magnesite

std. 1/2-in. grains	
Domestic, f.o.b. Balt. and Chester in bulk, fines removed	\$51.50
Domestic, f.o.b. Chewelah, Wash., in bulk with fines	27.00
in sacks with fines	31.50

Dead Burned Dolomite

F.o.b. producing points in Pennsylvania, West Virginia and Ohio, per net ton, bulk. Midwest, add 10¢; Missouri Valley, add 20¢ ..	\$11.00
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PRICES

WAREHOUSE PRICES

Base prices, delivered metropolitan areas, per 100 lb.

CITIES	SHEETS			STRIP		PLATES	SHAPES	BARS		ALLOY BARS			
	Hot-Rolled	Cold-Rolled (16 gage)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled			Hot-Rolled	Cold-Finished	Hot-Rolled, A 4815 As-rolled	Hot-Rolled, A 4140-50 Ann.	Cold-Drawn, A 4815 As-rolled	Cold-Drawn, A 4140-50 Ann.
Philadelphia.....	\$4.66	\$5.77	\$5.90	\$4.82	\$5.90	\$4.85	\$4.57	\$4.87	\$5.75	\$5.47	\$8.77	\$10.30	\$10.45
New York.....	4.78	5.78 ¹	6.16	5.08	6.08	5.11	4.80	5.06	5.80	5.88	8.83	10.35	10.50
London.....	4.83	5.69	6.23 ¹²	5.61	6.87	5.18	4.91	5.04	5.88	5.99	9.14	10.43	10.58
Baltimore.....	4.32	.....	5.72	4.80	.....	4.77	4.71	4.85	.....	.....	.....	.....	.....
Pittsburgh.....	4.90	.....	.....	5.30	.....	5.15	5.15	5.20	.....	.....	.....	.....	.....
Chicago.....	4.25	5.10	6.65	4.35	5.45- 6.65	4.60	4.40	4.48	5.10	.....	8.35	9.50	9.55
Waukegan.....	4.458	5.308	5.858	5.058	5.688	4.808	4.608	4.608	5.395	5.645	8.795	9.945	10.095
Weld.....	4.25	5.10 ¹	5.82	5.05	4.60 ¹	4.70	4.40	5.10	5.81	5.76	8.76	9.50	9.55
Galveston.....	4.25	5.10	6.03	5.23	5.72 ⁵	4.98	4.40	4.40 ¹	5.10	5.20	8.35	9.50	9.55
Portland.....	4.41	5.26	6.07	4.77	5.67	4.9- ¹	4.82	4.86- 4.82	5.28	5.82	8.97	10.09	10.24
San Francisco.....	4.56	5.22	6.77	4.77	.....	4.98	4.82	4.78	5.63	.....	.....	.....	.....
Louisville.....	4.61	5.46	6.22	4.71	6.02	4.96	4.76	4.76	5.67	5.92	9.07	10.22	10.37
Sanburgh.....	4.25	5.10 ¹	5.85	4.35	.....	4.60	4.40	4.40	5.10	5.20	8.35	9.50	9.55
Portland, Ore.....	4.68	5.53	6.08	4.78	.....	5.03	4.83	4.83	5.00	.....	.....	.....	.....
St. Paul.....	5.262	.....	6.712	5.362	.....	5.612	5.412	5.412	6.112	.....	.....	.....	.....
Indianapolis.....	4.55	5.38	5.93	4.65	5.95	4.90	4.70	4.70	5.67	.....	.....	.....	.....
Birmingham.....	4.45 ¹¹	.....	5.80	4.45 ¹¹	.....	4.85 ¹¹	4.40 ¹¹	4.40 ¹¹	6.13	.....	.....	.....	.....
Memphis.....	4.88 ¹¹	5.94 ¹	6.43	5.08 ¹¹	.....	5.23 ¹¹	5.03 ¹¹	5.03 ¹¹	5.94	.....	.....	.....	.....
New Orleans.....	*5.05 ¹¹	6.39 ¹	.....	5.25 ¹¹	.....	5.40 ¹¹	*5.10 ¹¹	*5.20 ¹¹	6.39 ⁶	.....	.....	.....	.....
Boston.....	5.55	.....	7.05	5.65	.....	5.90	5.70	5.70	7.00	9.40	9.25	10.40	10.55
Los Angeles.....	5.75	7.35 ¹	7.40	6.05	8.70 ⁵	5.55	5.35	5.60	7.35 ¹⁴	9.70 ¹⁵	9.55 ¹⁰	11.15 ¹⁵	11.30 ¹⁵
San Francisco.....	5.40 ⁸	6.65	7.05	5.75 ⁸	8.70	5.50	5.30	5.05	7.50	9.70 ¹⁵	9.55 ¹⁵	11.15 ¹⁵	11.30 ¹⁵
Little Rock.....	5.45 ⁴	7.25 ²	7.10	5.60 ⁴	.....	5.90	5.25 ⁴	5.45 ⁴	7.45 ¹⁴	.....	8.95 ¹⁶	.....	11.39 ¹⁵
Portland, Me.....	5.45 ⁴	7.25 ²	7.10	5.85 ⁴	.....	5.70 ⁴	5.45 ⁴	5.55 ⁴	7.45 ¹⁴	.....	8.95 ¹⁵	.....	11.30 ¹⁵
Lake City.....	6.40	.....	7.85	6.70	.....	6.20	6.35	6.65	7.55	.....	.....	.....	.....

BASE QUANTITIES

Standard unless otherwise keyed on
loes.

HOT-ROLLED: Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD-ROLLED: Sheets, 400 to 1999 lb:

strip, extras on all quantities; bars 1000 lb and over.

ALLOY BARS: 1000 to 1999 lb.

GALVANIZED SHEETS: 450 to 1499 lb.

EXCEPTIONS: (1) 400 to 1499 lb; (2) 450

to 1499 lb; (3) 300 to 4999 lb; (4) 300 to 9999 lb; (5) 2000 lb and over; (6) 1000 lb and over; (7) 400 to 14,999 lb; (8) 400 lb and

over; (9) 500 to 1999 lb; (10) 500 to 999 lb; (11) 400 to 3999 lb; (12) 450 to 3749 lb; (13) 400 to 1999 lb; (14) 1500 lb and over; (15) 1000 to 4999 lb; (16) 4000 lb and over; (17) up to 1999 lb.

* Add 46¢ for sizes not rolled in Birmingham

† Up to $\frac{3}{4}$ in. thick and 90 in. wide.

‡ Add 38¢ for sizes not rolled at Buffalo.

PIG IRON PRICES

Dollars per gross ton. Delivered prices represent minimums. Delivered prices do not include 3 pct tax on freight.

BASING POINT* PRICES						DELIVERED PRICES† (BASE GRADES)							
Basing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.	Consuming Point	Basing Point	Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Highland	40.00	40.50	41.00	41.50		Boston	Everett	\$0.50 Arb.		45.50	46.00		
Hingham	39.88	39.38				Boston	Steeleton	8.78	45.78				51.78
		39.38				Brooklyn	Bethlehem	3.60	43.60	44.10	44.60	45.10	
Fall	40.00	40.00	40.50			Cincinnati	Birmingham	6.85	44.73	42.23			
	41.89*	42.38*	42.88*				Bethlehem	2.21	42.21	42.71	43.21	43.71	
Cape Cod	38.50	39.00	39.50	40.00		Los Angeles	Provo	7.13	46.13	46.63			
Danvers	38.50*	39.00	39.50			Mansfield	Cleveland-Toledo	2.56	41.06	41.56	42.06	42.56	
	39.75*	40.25*	40.75*						42.31*	42.81*	43.31*		
Durham	39.00	39.50	40.00	40.50		Philadelphia	Bethlehem	2.00	42.00	42.50	43.00	43.50	
Easton	39.50	39.00	39.50	40.00		Philadelphia	Swedeland	1.21	46.21	46.71	47.21	47.71	
Greenville		45.00	45.50			Philadelphia	Steeleton	2.59	42.59				48.59
Granville City	39.50	40.00	40.50			San Francisco	Provo	7.13	46.13	46.63			
Hammond	39.00	39.50		40.00		Seattle	Provo	7.13	46.13	46.63			
Harperville	39.00	39.50	39.50	40.00		St. Louis	Granite City	0.75 Arb.	40.25	40.75	41.25		
Hartford	40.00				40.00								
Hatfield	39.50												
Hawthorn, Ohio	45.00	45.50	46.00	46.50									
Hedeland	38.50	39.00	39.50	40.00									
Hempstead					40.00								
Houston, N. Y.													
Inglisstown	39.00	39.50	39.50	40.00									

* Republic Steel Corp. price. Basis: pig iron at Cleveland and Buffalo set by average price of No. 1 hvy. mlt. steel scrap at Cleveland or Buffalo respectively as shown in last week's issue of THE IRON AGE. Price is effective until next Sunday midnight.

Basing point prices are subject to switching charges; silicon differential (not to exceed 50¢ per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 1.85 pct); phosphorus differentials, a reduction of 38¢ per ton for phosphorus content of 0.03 pct and over; manganese differentials, a charge not to exceed 50¢ per ton for each 0.02 pct manganese content in excess of 1.00

pet. \$2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and \$1 per ton extra for each additional 0.25 pct nickel.

Silvery iron (blast furnace) silicon 8.00 to 6.50 pct, C/L per g.t., f.o.b. Jackson, Ohio—\$49.50; f.o.b. Buffalo—\$50.75. Add \$1.25 per ton for each additional 0.50 pct Si, up to 12 pct. Add 50¢ per ton for each 0.50 pct

Mn over 1.00 pct. Add \$1.00 per ton for 0.75 pct or more P. Bessemer ferrosilicon prices are \$1.00 per ton above silvery iron prices of comparable analysis.

Charcoal pig iron base price for low phosphorus \$55.00 per gross ton, f.o.b. Lyle, Tenn. Delivered Chicago, \$62.46. High phosphorus charcoal pig iron is not being produced.

Ferromanganese

78-82% Mn, Maximum contract base price, gross ton, lump size, f.o.b. Baltimore, Philadelphia, New York, Birmingham, Rookwood, Tenn.

Carload lots (bulk)\$145
Less ton lots (packed) 189.00
Delivered Pittsburgh 151.00

\$1.80 for each 1% above 82% Mn; penalty, \$1.80 for each 1% below 78%.

Briquets—Cents per pound of briquet, freight allowed, 66% contained Mn.

	Eastern	Central	Western
Carload, bulk ...	8.70	8.95	9.60
Ton lots ...	10.30	10.90	12.80
Less ton lots ...	11.20	11.80	13.70

Spiegeleisen

Contract prices, gross ton, lump, f.o.b. Palmerton, Pa.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Carloads	\$51.00	\$52.00
F.o.b. Pittsburgh, Pa. 50.00		51.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, f.o.b. shipping point, freight allowed, eastern zone.

96% min. mn, 0.2% max. C, 1% max. Si, 2% max. Fe.

Carload, bulk	32
L.c.l. lots	34

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	32
Ton lots	34
Less ton lots	36

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, f.o.b. shipping point, freight allowed, eastern zone.

	Carloads	Ton	Less
0.07% max. C. 0.06%			
P, 90% Mn.	23.00	24.85	26.05
0.10% max. C.	22.50	24.35	25.55
0.15% max. C.	22.00	23.85	25.05
0.30% max. C.	21.50	23.35	24.55
0.50% max. C.	21.00	22.85	24.05
0.75% max. C.			
7.00% max. Si.	18.00	19.85	21.05

Silicomanganese

Contract basis, lump size, cents per pound of metal, f.o.b. shipping point, freight allowed, 65-70% Mn, 17-20% Si, 1.5% max. C.

Carload bulk	7.80
Ton lots	9.45
Briquet, contract basis, carlots, bulk freight allowed, per lb of briquet	8.75
Ton lots	10.35
Less ton lots	11.25

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, openhearth \$78.00, foundry, \$79.00; \$78.75 f.o.b. Niagara Falls; \$77.50 f.o.b. Jackson, Ohio. Electric furnace silvery iron is not being produced at Jackson. Add \$1.00 per ton for each additional 0.50% Si up to and including 18%. Add \$1.00 per ton for each 0.50 pct Mn over 1 pct.

Silicon Metal

Contract price, cents per pound contained Si, lump size, f.o.b. shipping point, freight allowed, for ton lots packed.

	Eastern	Central	Western
96% Si, 2% Fe..	16.90	17.50	18.10
97% Si, 1% Fe..	17.30	17.90	18.50

Silicon Briquets

Contract price, cents per pound of briquet, bulk, f.o.b. shipping point, freight allowed to destination, 40% Si, 1 lb Si briquets.

	Eastern	Central	Western
Carload, bulk ...	5.25	5.50	5.70
Ton lots	6.85	7.45	7.75
Less ton lots ...	7.75	8.35	8.65

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump size in carloads, f.o.b. shipping point, freight allowed.

	Eastern	Central	Western
25% Si	15.50		
50% Si	9.30	9.80	10.00
75% Si	11.80	12.10	12.85
85% Si	13.30	13.60	14.35
90% Si	15.00	15.30	16.00

Ferrochrome (65-72% Cr, 2% max. Si)

Contract prices, cents per pound, contained Cr, lump size in carloads, f.o.b. shipping point, freight allowed.

	Eastern	Central	Western
0.06% C	26.50	26.90	27.00
0.10% C	26.00	26.40	26.50
0.15% C	25.50	25.90	26.00
0.20% C	25.25	25.65	25.75
0.50% C	25.00	25.40	25.50
1.00% C	24.50	24.90	24.75
2.00% C	24.25	24.65	24.75

65-69% Cr,
4-9% C 18.60 19.00 19.15
62-66% Cr, 4-6% C

6-9% Si 19.45 19.85 20.00

Briquets—Contract price, cents per pound of briquet, f.o.b. shipping point, freight allowed, 60% chromium.

	Eastern	Central	Western
Carload, bulk ...	12.50	12.75	12.85
Ton lots	14.00	14.90	15.50
Less ton lots ...	14.90	15.80	16.40

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 2¢ per lb to regular low carbon ferrochrome price schedule. Add 2¢ for each additional 0.25% N.

S. M. Ferrochrome

Contract price, cents per pound chromium contained, lump size, f.o.b. shipping point, freight allowed.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

	Eastern	Central	Western
Carload	19.70	20.10	20.25
Ton lots	21.85	23.15	23.95
Less ton lots ...	23.35	24.65	25.45

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.

	Eastern	Central	Western
Carload	25.00	25.40	25.50
Ton lots	27.30	27.95	29.15
Less ton lots ...	29.10	29.75	30.95

Chromium Metal

Contract prices, cents per lb, chromium contained carload packed, f.o.b. shipping point freight allowed, 97% min. Cr. 1% max. Fe.

	Eastern	Central	Western
0.20% max. C. ..	97.00	98.50	99.75
0.50% max. C. ..	93.00	94.50	95.75
9.00% min. C. ..	91.50	93.00	94.25

Calcium—Silicon

Contract price per lb of alloy, lump, f.o.b. shipping point, freight allowed.

30-35% Ca, 60-65% Si, 3.00% max. Fe
r 28-32% Ca, 60-65% Si, 6.00% max. Fe.

	Eastern	Central	Western
Carloads	16.25	16.75	18.80
Ton lots	19.35	20.10	22.25
Less ton lots ...	20.85	21.60	23.75

Calcium—Manganese—Silicon

Contract prices, cents per lb of alloy, lump, f.o.b. shipping point, freight allowed.

16-20% Ca, 14-18% Mn, 53-59% Si.

	Eastern	Central	Western
Carloads	17.50	18.00	20.05
Ton lots	19.80	20.65	22.40
Less ton lots ...	20.80	21.65	23.40

Calcium Metal

Eastern zone contract prices, cents per pound of metal, f.o.b. shipping point, freight allowed. Add 1.5¢ for central zone; 3.5¢ for western zone.

	Cast	Turnings	Distilled
Ton lots	\$1.85	\$2.70	\$3.40
Less ton lots ...	2.20	3.05	4.20

CMSZ

Contract price, cents per pound of alloy, f.o.b. shipping point, freight allowed.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.

Alloy 5: 50-56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.

	Eastern	Central	Western
Ton lots	18.00	19.10	21.05
Less ton lots ...	19.25	20.35	22.30

SMZ

Contract price, cents per pound of alloy, f.o.b. shipping point, freight allowed.
60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe, ½ in. x 12 mesh.

	Eastern	Central	Western
Ton lots	15.75	16.85	18.80
Less ton lots ...	17.00	18.10	20.05

Other Ferroalloys

Ferrotungsten, standard, lump or ¼ x down, packed, f.o.b. plant
Niagara Falls, Washington, Pa.,
York, Pa., per pound contained
W, 5 ton lots, freight allowed... \$2.

Ferrovanadium, 35-55%, contract basis, f.o.b. plant, freight allowances, per pound contained V.

Openhearth \$2
Crucible 3
High speed steel (Primos) 3.

Vanadium pentoxide, 88-92% V₂O₅, contract basis, per pound contained V₂O₅..... \$1.

Ferrocolumbium, 50-60%, contract basis, f.o.b. plant, freight allowed, per pound contained Cb

Ton lots \$2
Less ton lots \$2.

Ferromolybdenum, 55-75%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo. 9

Calcium molybdate, 40-45%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo. 8

Molybdenum oxide briquets, 48-52% Mo, f.o.b. Langeloth, Pa., per pound contained Mo..... 8

Molybdenum oxide in cans, f.o.b. Langeloth and Washington, Pa., per pound contained Mo..... 8

Ferrotitanium, 40-45%, 0.10% C max., f.o.b. Niagara Falls, N. Y., ton lots, per pound contained Ti

Ferrotitanium, 20-25%, 0.10% C max., ton lots, per pound contained Ti \$1.
Less ton lots \$1.

High carbon ferrotitanium, 15-20%, 6-8% C, contract basis, f.o.b. Niagara Falls, freight allowed, carloads, per net ton....\$152.

Ferrophosphorus, electrolytic, 23-26%, carlots, f.o.b. Siglo, Mt. Pleasant, Tenn., \$3 unitage, per gross ton \$65.
Less ton lots \$1.

Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.

Carload lots 18.4

Zirconium, 12-15%, contract basis, lump, f.o.b. plant, freight allowed, per pound of alloy

Carload, bulk 6.0

Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y.

Carload 7.2
Ton lots 7.7

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound

Car lots 9.5
Ton lots 10.2

Boron Agents

Contract prices per pound of alloy, f.o.b. shipping point, freight allowed.

Ferroboreon, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C.

	Eastern	Central	Western
.....	\$1.20	\$1.23	\$1.21

Manganese—Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C.

Ton lots ... \$1.89 \$1.903 \$1.935
Less ton lots 2.01 2.023 2.044

Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni.

Less ton lots...\$1.80 \$1.8125 \$1.84
Silcaz, contract basis, f.o.b. plant freight allowed, per pound.

Carload lots 39.00
Grainal, f.o.b. Bridgeville, Pa., freight allowed, 50 lb and over.

No. 1 9
No. 6 6
No. 79 4

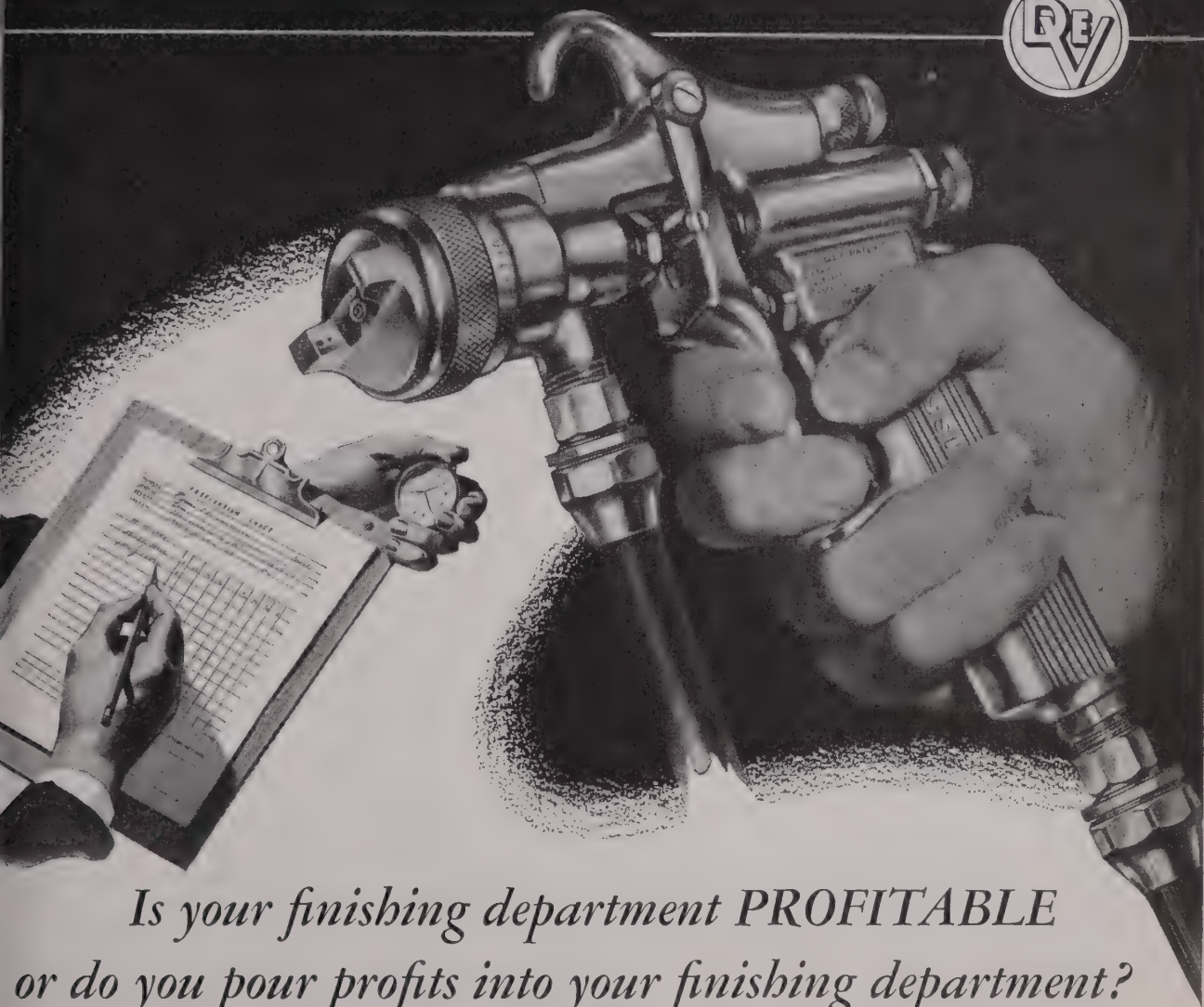
Bortram, f.o.b. Niagara Falls
Ton lots, per pound 4
Less ton lots, per pound 5

Carbortam, f.o.b., Suspension Bridge, N. Y., freight allowed, Ti 15-17%, B 3.0-1.15%, Si 2.5-3.0%, Al 1.0-2.0%.

Ton lots, per pound 8.

Borosil, f.o.b. Philo, Ohio, freight allowed, B 3%-4%, Si 40%-45%, per lb contained B.....\$6.1

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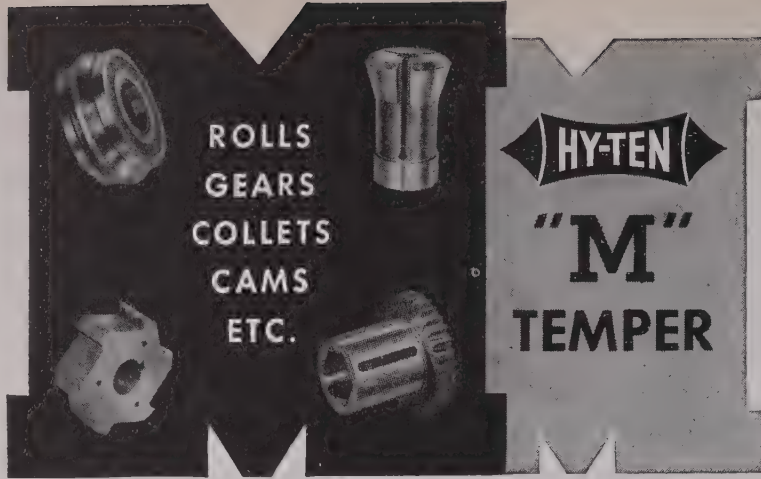
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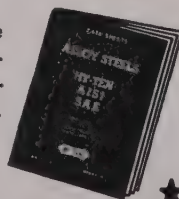


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BILLETS AND FORGINGS FOR PRODUCTION, TOOL ROOM AND MAINTENANCE REQUIREMENTS.

PERSONALS

Continued from page 112

• **Arthur J. Beal** and **Jack E. Papy** have joined the sales organization of James A. Coe & Co. of Newark, N. J. Mr. Beal was recently with Reliance Steel Div. of Detroit Steel Corp. Mr. Papy had been with the Edgcomb Steel Corp.

• **George R. Frankland** has been appointed Chicago district manager of Johns-Manville Corp.'s industrial products division, succeeding **Corydon H. Hall**, who has resigned. **William S. Hough**, formerly manager of the chemical and aviation sections of the company's special industries department at New York, assumes Mr. Frankland's former duties in Chicago as assistant district manager, industrial products division.

• **Joseph H. Humble** has been appointed general sales and advertising manager of the Kester Solder Co., Chicago. Mr. Humble has been associated with Kester Solder for 25 years.

• **Edmund E. Wegrzyn**, assistant traffic manager of the Bell Aircraft Corp., Buffalo, has been named traffic manager to succeed **Elmer Dunn**, who has resigned.

• **Frank J. Peterson** has been appointed director of industrial relations for Lustron Corp., Columbus, Ohio. He has been with the construction division of the War Production Board and Civilian Production Administration from 1940 to 1948.

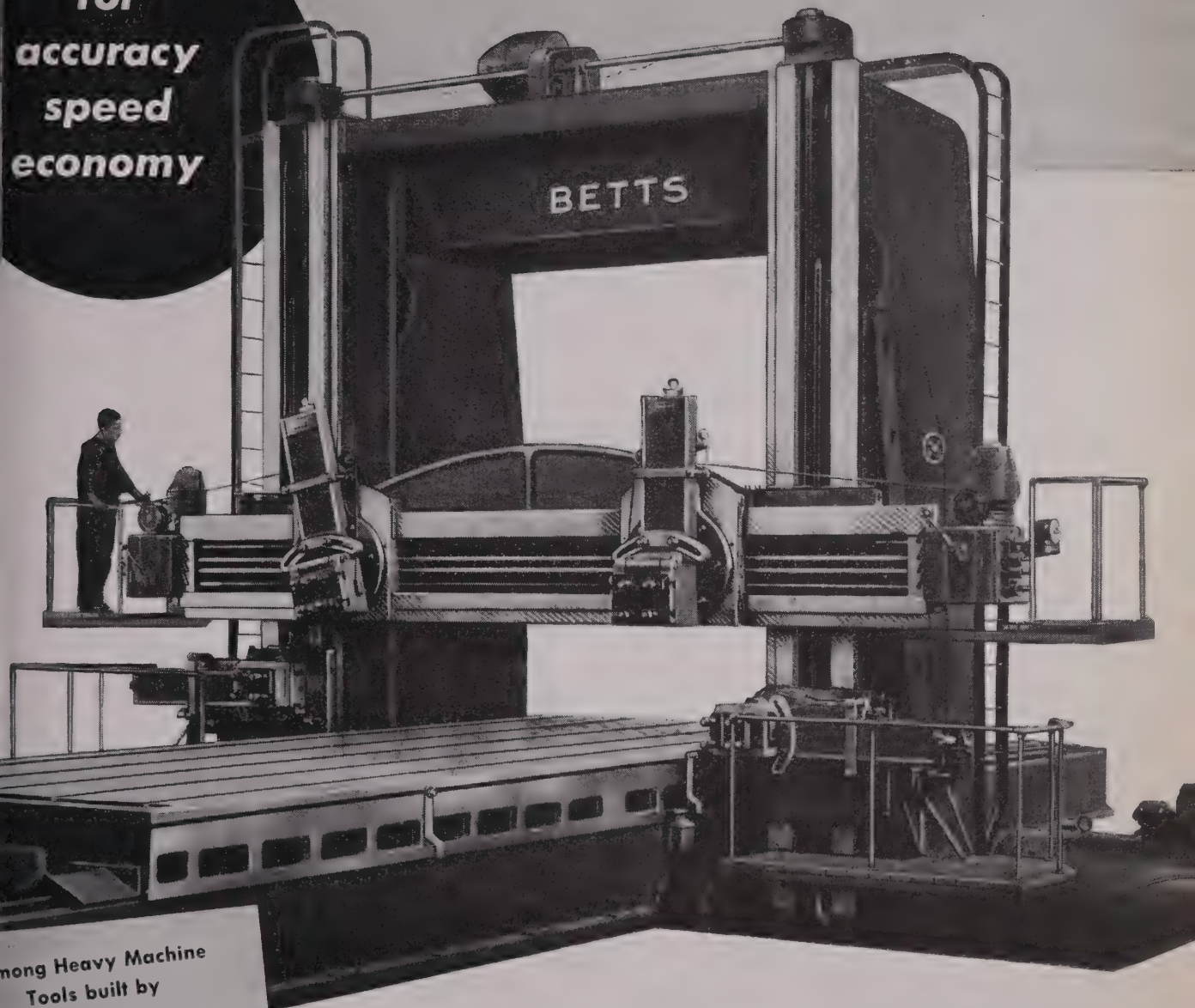
• **Louis N. Wilputte** has retired as president of Wilputte Coke Oven Div., Allied Chemical & Dye Corp., New York, but will continue with the company as a consultant.

• **Raymond K. McClintock** has been appointed assistant to the chief engineer of the radio tube division of Sylvania Electric Products Inc., Emporium, Pa. Mr. McClintock formerly engineering manager for Sylvania's International Division joined the radio tube engineering department in 1936.

• **Dale D. Spoor** has been named manager of the equipment sales department of Air Reduction Sales Co., New York. **Ira B. Yates** has become manager of arc welding and supplies sales and **J. F. Carroll** has

BETTS HEAVY DUTY PLANERS

for
**accuracy
speed
economy**



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The Betts Heavy Duty Planer shown here provides 14'-0" between uprights, 11'-6" under tools and 28'-0" stroke. It is designed with three bed ways for even load distribution when machining especially heavy work. Variable voltage planer drive provides smooth, accurate operation in a wide speed range. Built in a range of sizes up to any requirement. All Betts Planers are soundly engineered to insure long, dependable service combined with operational economy, safety and convenience.

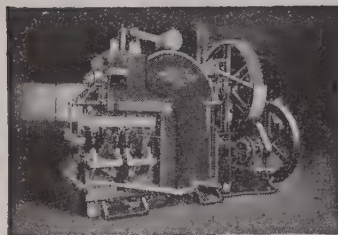
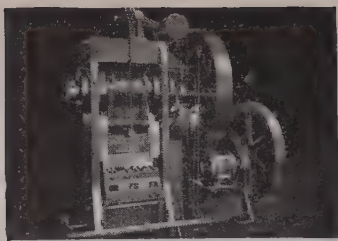
*Complete information will
be furnished upon request*

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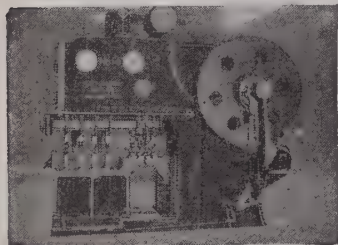
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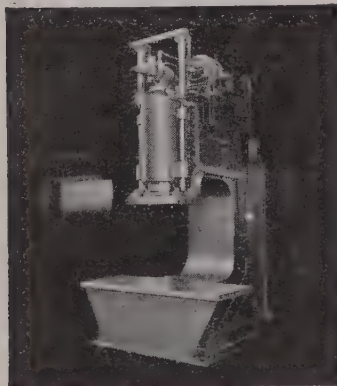
BEATTY No. 11-B heavy duty punch for production tooling and use with BEATTY Spacing Table.



BEATTY No. 14 Toggle Beam Punch for structural steel fabrication.



BEATTY Horizontal Hydraulic Bulldozer for heavy forming, flanging, bending.



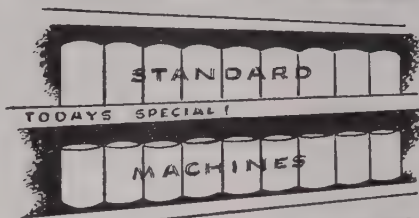
BEATTY 250-ton gap type press for forming, bending, flanging, pressing.



BEATTY MACHINE AND MFG. COMPANY
HAMMOND, INDIANA



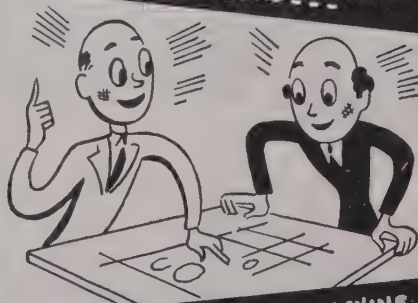
WHEN SEARCHING FOR PRODUCTION IMPROVEMENTS



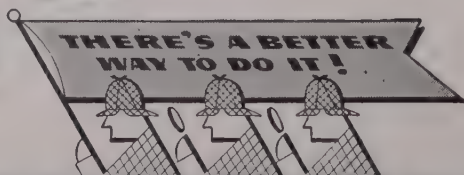
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BRING US YOUR PROBLEMS AND IDEAS...



AND LET US BUILD A MACHINE AROUND THEM. THAT'S THE WAY TO GAIN A TRUE COMPETITIVE PRODUCTION ADVANTAGE



PERSONALS

comes manager of apparatus sales upon the merger of the former apparatus sales department and the arc welding sales department into one department known as the equipment sales department. Mr. Spoor had been manager of the dealer sales department since 1941. Mr. Yates became manager of the former arc welding sales department in 1944, and Mr. Carroll since 1931 had been assistant to the apparatus sales manager.

• **Prescott Sandidge** has been appointed assistant director, with responsibility for administrative matters, of the central research department of Monsanto Chemical Co., Dayton. Mr. Sandidge was formerly executive director of the Clinton National Laboratories, operated by Monsanto for the Atomic Energy Commission.

• **Charles J. Reimer** has been named general purchasing agent of SKF Industries, Inc., Philadelphia, succeeding **J. F. Whelihan**, who resigned. Mr. Reimer was formerly procurement metallurgist for the company.

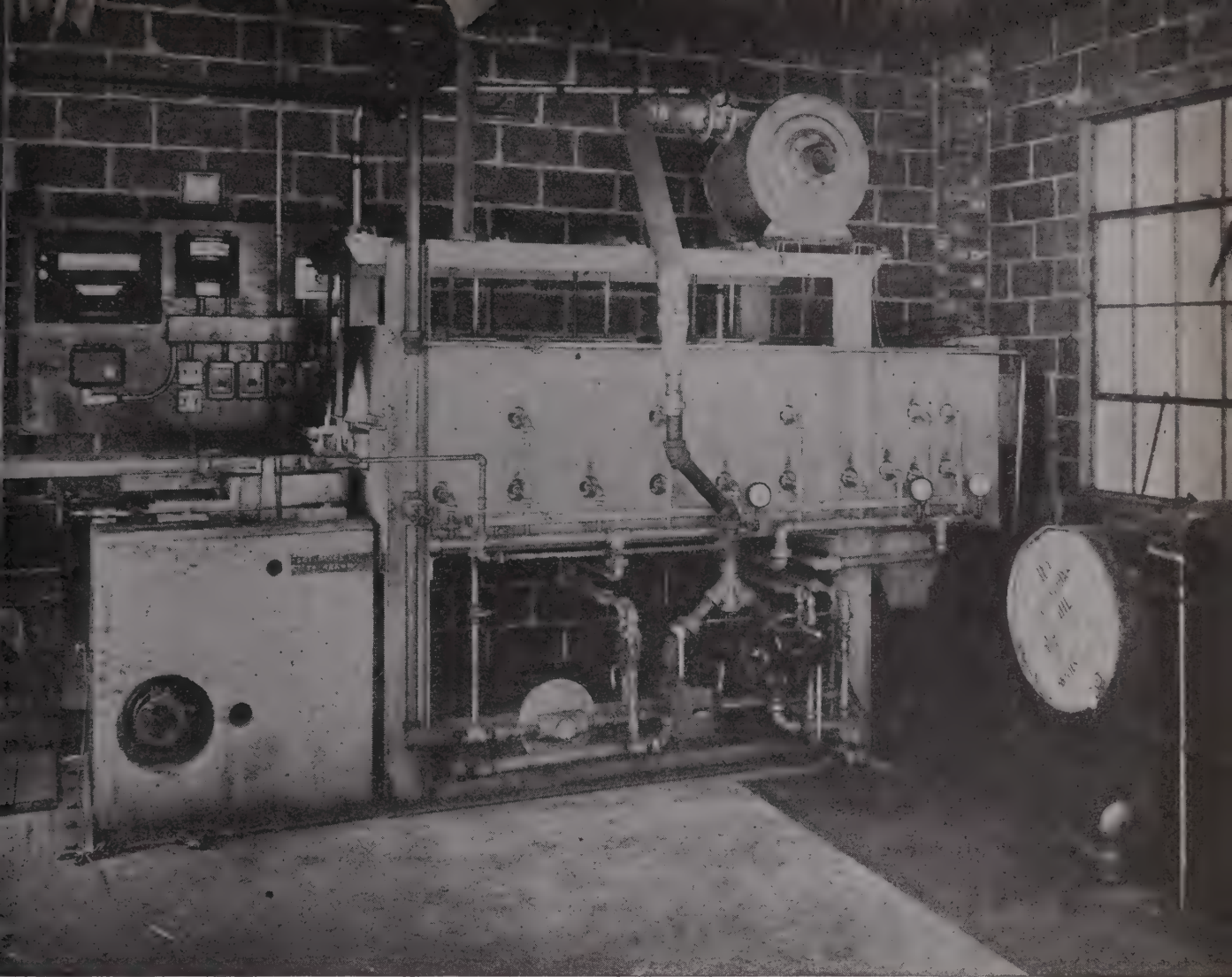
• **Frank A. Gabriel** has retired as sales manager of the Perfection Stove Co.'s stove and heater division, Cleveland. He had been with the company since 1918.

• **E. W. Bernitt** has been appointed works manager of the Nash Motor Div. plant at Kenosha, Wis. Mr. Bernitt joined the Nash-Kelvinator Corp. in 1938. He succeeds the late **Harold E. Long**, **P. G. Little**, who temporarily served as works manager following Mr. Long's death. He has been named assistant works manager. **L. H. Finkler** has been appointed general superintendent with **Walter Tobias** as assistant general superintendent.

• **Charles R. Sorber, Jr.** has been made St. Louis district sales representative for Pennsylvania Sales Mfg. Co.'s special chemicals division. Prior to joining Pennsylvania last September he was a sales engineer with Proctor & Schwartz Inc.

• **Paul E. Peacock, Jr.** has resigned as manager of Martinsburg Gas Heating Co., Martinsburg, W. Va. to devote his full time to activities with **H. Emerson Thomas & Associates** of Westfield, N. J.

• **O. H. Larimer** has been promoted to the post of sales manager of Perfection Stove Co.'s range and heater division, Cleveland. Mr.



Reciprocating Furnace in the Plant of Well-Known Hardware Manufacturer.

VERSATILE RECIPROCATING, CONTROLLED ATMOSPHERE FURNACES SUITED TO WIDE VARIETY OF PROCESSES AND PRODUCTS

VERSATILITY is an outstanding characteristic of A.G.F. Reciprocating Furnaces which are suited to continuous clean hardening, annealing, normalizing, case-hardening by the patented Ni-Carb process, and many other types of work.

AMONG USERS are manufacturers of bearings, screws, lock washers, tools, wrenches, flat and coil springs, steel writing pens, and many others. Commercial heat treaters especially favor Reciprocating Furnaces because these furnaces are able to handle the many varied and different jobs daily received in a general heat-treating shop.

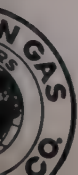
Engineering representatives are available in principal cities. Consult your local directory.

THE RECIPROCATING MUFFLE advances work through the heat by its own momentum. The complete elimination of conveying mechanism from the heating chamber reduces maintenance problems and heat losses to a minimum. There is no traveling belt to be alternately heated and cooled — only work enters and leaves the furnace.

MANUFACTURED IN FIVE SIZES, Reciprocating Furnaces have capacities ranging from 10 to 1200 pounds of work per hour. Write for detailed literature on these furnaces and other types of heat-treating equipment.

AMERICAN GAS FURNACE CO.

1004 LAFAYETTE STREET, ELIZABETH, N. J.



Larimer came to Perfection Stove Co. in 1918. Since 1944 he has been assistant sales manager of the company's cook stove and heat division.

• **Thomas T. Parker** has assumed his new post as pressed metal manufacturing engineer at the Portland, Ore. plant of the Hyster Co. Mr. Parker was formerly assistant to the superintendent at the B. Products Steel Corp., a subsidiary of Lukens Steel Co.

• **F. J. Staroba**, formerly sales engineer for Carboloy Co., Inc., has been appointed to the position of manager of the midwestern district for Carboloy, with headquarters in Chicago. He succeeds **W. D. Brown**, who has resigned. Mr. Staroba has been with Carboloy for 10 years.

• **Norman J. Collister** has been appointed vice-president of Frederick Hart & Co., an ATF Association Poughkeepsie. Mr. Collister will continue as general sales manager in which capacity he joined the company in 1947, after serving as sales manager of the electric typewriter division, International Business Machines Corp.

• **John C. Barnes** has been elected vice-president for sales of the National Radiator Co., Johnstown, Pa. Mr. Barnes was a former sales manager of the company's Washington and Philadelphia branch offices, respectively, and has been associated with the firm since 1940.

• **Charles S. Silsbee**, formerly manager of the marine division, New York office of the Dearborn Chemical Co., has been transferred to the main office in Chicago. He will be assistant to E. P. Fager, vice president of the industrial feed water sales and engineering department.

• **Johan C. Kromhout** has been appointed manager of European sales for Sylvania Electric Products Inc. in New York. He joined Sylvania in 1943 as lighting engineer and architectural consultant to the company's Lighting Center.

• **Ernest Gerhart** has been appointed eastern regional manager of the Metal-Clean Solvent Corp. of Chicago. Mr. Gerhart was formerly metallurgist contact representative of the U. S. Steel Corp. chief metallurgist of the Reliance



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.... This new aluminum bronze alloy combines ductility for cold heading and high strength-weight ratio for economy

HERE'S the first real answer to your demand for an aluminum bronze suitable for cold heading — Ampcoloy 49. It is alloyed specifically to provide the ductility that cold heading requires. Light in weight and strong, as are all aluminum bronzes, Ampcoloy 49 is still further improved by cold working.

You can get Ampcoloy 49 as extruded solid rod in diameters up to 3", or in 100-pound coils of cold-heading wire, sizes from .125 to .420 gauge.

Use Ampcoloy 49 for economical cold-heading production of bolts, rivets, screws, and similar fastenings. Take advantage of its excellent spring characteristics, its corrosion resistance, and its weldability. It can be cold-coined, cold-forged — and annealed, if it is desirable to change its physical properties. And in every application, you have the advantage of the clean, sound grain structure and close tolerances delivered by the extrusion process. For complete information on Ampcoloy 49, write for Bulletin 88.

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Specialists in engineering, production, finishing of copper-base alloy parts and products.



Head Start to Safety!



Just before he starts his day's work, the coal miner you see above is picking up his electric "headlight" in the mine lamp house.

Providing and maintaining modern cap lamps may seem like a small detail in coal mine operation. But mine safety depends on attention to details—such details as *dressing* the miner in safety equipment, *diagramming*, on a mine map, his working locations, *drilling* him constantly in safe working methods.

To prevent explosions, modern mines are "rock-dusted." Giant fans keep the air fresh. Automatic safety gates confine possible danger.

And these are only a few of the countless measures in the never-ending effort to remove every possible source of preventable danger in the mines.

As a result of this intensive safety program, America's coal mines are now twice as safe as they were 40 years ago on the basis of man hours worked—and more than four times safer on the basis of tons mined.

BITUMINOUS  COAL

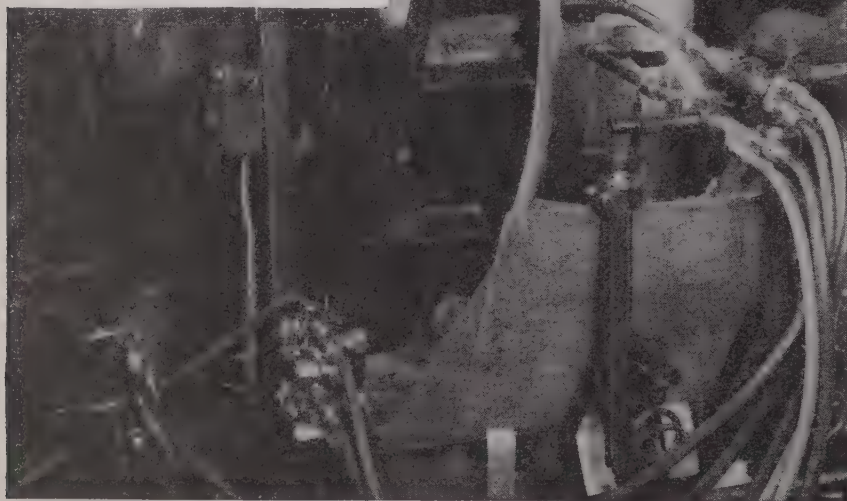
BITUMINOUS COAL INSTITUTE

A DEPARTMENT OF NATIONAL COAL ASSOCIATION
WASHINGTON, D. C.

BITUMINOUS COAL . . . LIGHTS THE WAY . . . FUELS THE FIRES . . . POWERS THE PROGRESS OF AMERICA

3400 pound steel casting flame hardened in 25 minutes

COLUMBIA MACHINERY AND ENGINEERING CORP., of Hamilton, Ohio, had the problem of hardening the roller pads of a lower frame casting used on power shovels. Size and weight of this special steel casting made it impractical to use existing hardening equipment.



D. P. Carey, Airco Technical Sales Representative, suggested building a fixture for positioning and rotating the castings and for mounting the torches and accessory equipment. Using this special equipment, which rotates the 3400 pound casting at a speed of 7 inches per minute, the hardening cycle is accurately controlled

and requires only 25 minutes. Two torches simultaneously flame harden both the upper and lower faces of the roller rings to a depth of 3/32 inches. •

Thus, the hardening operation easily keeps pace with the rest of the shovel manufacturing and has more than proved entirely satisfactory.

TECHNICAL SALES SERVICE—ANOTHER AIRCO PLUS-VALUE FOR CUSTOMERS

Technical Sales Service—though not a packaged commodity—is as readily available to all industry as any Airco process or product. If you have a metal working problem, ask to have a Technical Sales Division man call. Address Dept. 1A-8246, Air Reduction, 60 East 42nd Street, New York 17, N. Y. In Texas: Magnolia Airco Gas Products Co., Houston 1, Texas. On West Coast: Air Reduction Pacific Company, San Francisco 4, California.



AIR REDUCTION

Offices in All Principal Cities

Headquarters for Oxygen, Acetylene and other gases . . . Carbide . . . Gs Welding and Cutting Machines, Apparatus and Supplies . . . Arc Welders, Electrodes and Accessories

PERSONALS

Div. of Eaton Mfg. Co., and more recently, chief metallurgist of the Ingersoll Steel Div. of the Borg-Warner Corp.

• **William G. Wilson** has been named plant manager of the Chevrolet Motor Div.'s Atlanta assembly plant. Mr. Wilson joined Chevrolet in 1921 and served as material supervisor at Chevrolet-Atlanta, Kansas City and St. Louis.

Charles F. Ward has been appointed plant manager of the Chevrolet-St. Louis assembly plant. Mr. Ward joined Chevrolet in 1921 and has been a member of the Chevrolet-St. Louis organization since that time.

• **Fred W. Adams** has been promoted to advertising manager of Packard Motor Car Co., Detroit. He joined Packard in 1942.

• **George S. Brett** has been appointed manager of the Kansas City warehouse of A. M. Castle & Co. Mr. Brett has been associated with the company in Seattle for the past 25 years, the last 10 years as manager of sales at that location. He is succeeded by **R. N. Vander Vart**, who has been associated with the company for 29 years.

• **Com. Edward Hart** has joined American Engineering Co. as manager of the New York office. Commander Hart spent 10 years in the U. S. Navy, and was later associated with Peabody Engineering Co. and A. O. Smith Co.

• **Rodney B. Campbell** has joined the Lynn Co., Burbank, Calif., as chief hydraulic engineer.

• **William O. Spink** has been appointed field engineer for Sylvania Electric Products Inc., making his headquarters in Cleveland. He was formerly associated with a radio station and the Thordarson Mfg. Co. of Chicago.

• **Roy H. Jaeger** has been appointed manager of Ferro Enamel Corp.'s Nashville sales territory, succeeding Paul Kates. Mr. Jaeger joined Ferro Chemical Corp., a Ferro Enamel Corp. subsidiary, as St. Louis district manager, in 1945.

• **Paul G. Kates** has been appointed factory superintendent, Industrial Enameling, Inc., New Orleans. Mr. Kates has been associated with Frigidaire Corp., Tennessee Enamel Mfg. Co. and Grigsby-Grunow Co. He joined

AN

Announcement

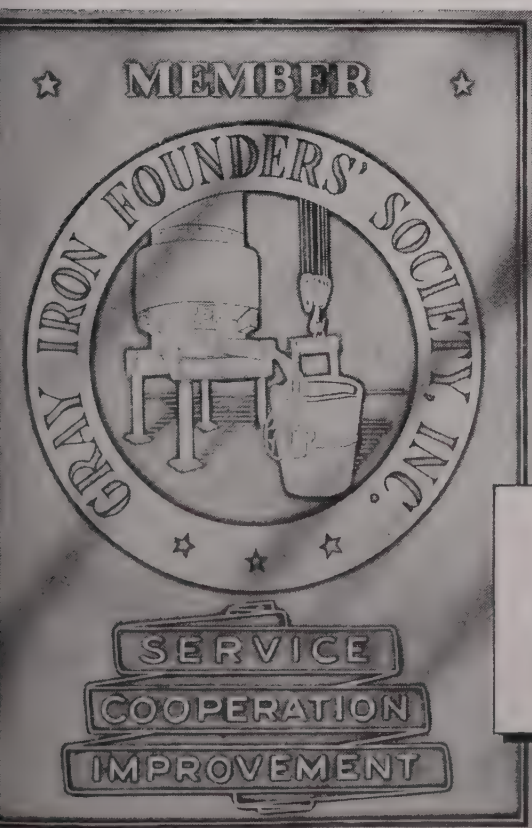
TO GRAY IRON PRODUCERS AND THEIR CUSTOMERS

Gray Iron Founders' Society, Inc., representing an industry with some two billion dollars of annual sales, has embarked upon a long-range program of research, self improvement and expansion commensurate with the limitless opportunity it sees ahead.

Fundamental in this program are plans for:

1. Assistance to users and potential users of Gray Iron in making their products better, in lowering their costs, or both.
2. Consultation and service to help members improve their products and their processes.
3. Education—within the membership, in technical schools and throughout industry as a whole—on the uses and characteristics of Gray Iron components.

This is the first of a series of messages to appear each month in a number of business papers.



Gray Iron Characteristics Include:

- Abrasion and wear resistance
- Corrosion resistance
- Machinability
- Damping capacity
- Heat resistance
- Rigidity
- Low notch sensitivity
- Durability
- Castability—dimensional accuracy
- Wide selection of mechanical properties

"MAKE IT BETTER WITH GRAY IRON"

**GRAY IRON FOUNDERS'
SOCIETY, INC.** 33 PUBLIC SQUARE
CLEVELAND 13, OHIO

the sales and service organization of the Ferro Enamel Corp. in 1939 and for the past 8 years has been manager of Ferro's Nashville sales territory.

• **Fred J. Heid**, formerly vice-president in charge of sales of the Vernon Allsteel Press Co. of Chicago has been appointed general sales manager of Ekstrom, Carlson & Co., Rockford, Ill., to replace S. Ekstrom, former president and sales manager, who has been appointed chairman of the board of directors.

• **Walker Davis** has been appointed manager of sales of Lapham-Hickman Co.'s carbon sheet and strip division, Chicago. He recently resigned from the sheet and strip sales department of Carnegie-Illinois Steel Corp.

• **Samuel H. Gifford** has been appointed sales representative of the Wayne Crane Div., American Steel Dredge Co. Inc., Fort Wayne, Ind.

• **William Tennant** has been appointed New York district representative for General Electric Co. conduit products. He was formerly connected with the company's wiring device and wire and cable sales sections in Bridgeport, Conn.

• **R. K. Patrick** has been appointed a salesman in the aircraft coating sales development section of Monsanto Chemical Co.'s Merrimack Div., Boston. Before joining Monsanto, Mr. Patrick served as first vice-president of Dayton, Ohio Airways.

• **Mrs. Catherine Beck** has been appointed director of home economics of the Crosley Div., Avco Manufacturing Corp., Cincinnati. Mrs. Beck joined Crosley in 1946 and has been serving as acting director of the department since 1947.

• **Fred B. Roth**, formerly supervisor, Monarch Machine Tool Co. service department in Sidney, Ohio, has been transferred to the West Coast as sales and service advisor to a number of dealers who represent Monarch there. He will maintain San Francisco his headquarters. **Donald J. Harshbarger**, formerly of Monarch's service department, has been transferred to the New York office of the company. **Clarence Caldwell** and **J. A. Garrison**, also former members of Monarch's service department, become field sales engineers for the company with headquarters in Chicago. **John**

270-ft. rotary kiln at Anaconda, Montana

Anaconda MANGANESE NODULES

AVERAGE ANALYSIS

Mn	60%
SiO ₂	8%
Al ₂ O ₃	0.76%
Fe	3.1%
P	0.06%

46381



ANACONDA COPPER MINING COMPANY

Offices: 25 Broadway, New York 4, N. Y.

Anaconda, Montana

It Takes 3 Different Steels to Make Yours Vanilla"



his syrup pump for soda fountains is readily accepted by health authorities because it's made of stainless steel.

Like many stainless products, however, this pump requires more than just a single steel. *Three* different stainless types are used—each for a specific advantage. The plunger assembly is Type 303 (machinability) . . . the cover plate and deep drawn cup are 302 sheet (ductility) . . . and the two fluid lines are 304 tubing (weldability). Despite this mixed requirement, all 3 forms, in the necessary analyses, are obtained *overnight* from Frasse warehouse.

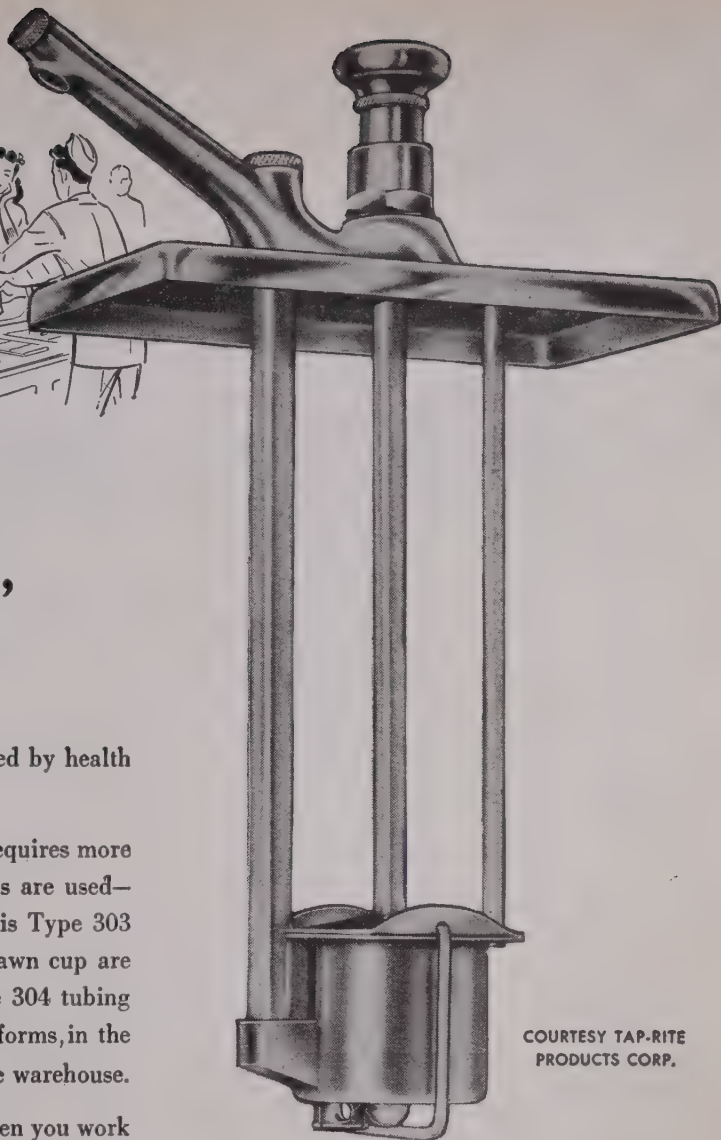
In fact, you can choose from *seven* stainless types when you work from Frasse stocks. And you can work with sheets, plates, strip, pipe, everything from bars to welding electrodes. All are immediately available stock items.

No matter how you use stainless steels, you'll find the wide choice and quick delivery provided by Frasse stocks a decided convenience. Send for our latest inventory. *Peter A. Frasse and Co., Inc., 17 Grand Street, New York 13, N. Y. (Walker 5-2200) • 3911 Wissahickon Avenue, Philadelphia 29, Pa. (Baldwin 9-9900) • 50 Exchange Street, Buffalo 3, N. Y. (Washington 2000) • Jersey City • Syracuse • Hartford • Rochester • Baltimore*

FRASSE

for Stainless Steels

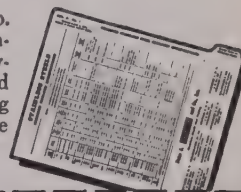
**BARS • SHEETS • PLATES • STRIP • TUBES
PIPE • ANGLES • WIRE • ELECTRODES**



COURTESY TAP-RITE
PRODUCTS CORP.

Are you up-to-date on Stainless Analyses?

Frasse Data Chart Sec. A, No. 1 lists all 31 standard stainless steels, and chemical analysis of each. Chart is heavy card stock, file size—just the thing for wall or desk use. Send the coupon for your free copy.



Peter A. Frasse and Co., Inc. 12-IA
17 Grand Street, New York 13, N. Y.

- ☐ Please send me your latest stainless steel stock inventory.
- ☐ Please send me a free copy of stainless analyses chart Sec. A, No. 1.

Name.....Title.....

Firm.....

Address.....

TAKE IT FROM **CRIMPY** THE BUFFALO WIRE CLOTH MAN



**"There's Nothing Like
'BUFFALO' PLAIN STEEL
WIRE CLOTH for All Around
Strength and Low Cost."**

MY WIRE IS FINEST GRADE STEEL

... each size is carefully selected from our choice of the nation's best mills. That accounts for my extraordinary weaving and crimping qualities.



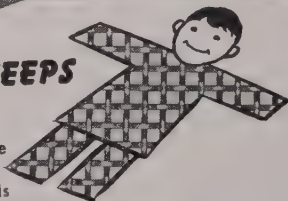
MY MESH IS ALWAYS ON THE BUTTON

... never misses ... always accurate ... and I have just about the largest variety of weaves in the business ... from round or flat wire.



MY DEEP CRIMP KEEPS MY MESH RIGID

... holds it firmly in place
... gives me long life. I'm crimped many ways for all kinds of service.



I'M WOVEN IN MANY SIZES

... of meshes and wires for every industrial need.



Check your files for our **INDUSTRIAL WIRE CLOTH CATALOG**. If you haven't a copy, you can get one by dropping us a line.

Buffalo WIRE WORKS CO., INC.

Manufacturer of All Kinds of Wire Cloth Since 1869

456 TERRACE

BUFFALO 2, N. Y.

PERSONALS

Wisener, who since the war was Monarch's engineering department laboratory, goes to the company's Cleveland sales office.

• **R. N. Shields** has been named assistant general traffic manager, Pittsburgh Steel Co., Pittsburgh. Mr. Shields was formerly assistant traffic manager, Pittsburgh branches, U. S. Steel Corp. subsidiaries.

• **Carl I. Collins** has been elected a director of the National Supply Co., Pittsburgh. He succeeds T. McGraw, Jr., who has retired from the board. Mr. Collins is president of Superior Steel Corp., Pittsburgh.

• **Rodman R. Tatnail**, quality control engineer, Wickwire Spencer Steel Co., Worcester, has been made assistant to plant manager at the company's Buffalo plant.

• **Roy J. Keller**, general sales manager of TelAutograph Corp., New York, has been elected a vice-president.

• **E. F. Nason** has been appointed general sales manager for Elast Stop Nut Corp. of America, Union, N. J. Prior to his new appointment he had been aircraft sales and product manager.

• **Marshall A. Shapiro** has been elected president of the Peerless Iron Works of Alameda, Calif. He is also president and partner of California Metals Co. of Oakland, Calif. **J. C. Stevens** has been elected vice-president and sales manager of Peerless and **Charles H. Davis** secretary-treasurer and general manager of all operations.

• **Robert P. Patterson**, former Secretary of War of the United States, has been elected a director of International Business Machines Corp., New York.

• **John D. Fenstermacher** has retired from his position as sales executive with Columbia Steel Co., San Francisco. For the past years he was associated with Columbia Steel Corp. and its successor, the Columbia Steel Co.

• **Nils Anderson**, president of Debevoise-Anderson Co., New York, has been elected a director of the Lawrence Portland Cement Co., New York.

• **John A. Sizer** has been named vice-president and sales manager of the Industrial Gear Mfg. Co., Chicago. Mr. Sizer has been con-

QUALITY... to meet your specifications



HERBRAND PRECISION FORGINGS

Upset forgings . . . drop forgings . . . in any size or shape up to 200 lbs. . . bearing the Herbrand "Diamond H" trade mark will fulfill every requirement of your products.

Strict adherence to specifications and contour effects a real economy in Herbrand Forgings by reducing machining and finishing operations to a minimum. And there's inbuilt stamina in every one, the result of scientific heat treating in the latest automatic electrically controlled furnaces.

Whatever your requirements in forgings, in orders of thousands or millions, Herbrand is your most faithful source of supply . . . as it has been for hundreds of industries since 1881. Your inquiries are solicited.



SINCE 1881

Herbrand

SUPER-QUALITY DROP FORGINGS

...the finest money can buy!

HERBRAND DIVISION

THE BINGHAM-HERBRAND CORP., FREMONT, OHIO

nected with the gear industry for the past 7 years and has more recently been engaged in sales work.

• **W. W. Davison** has been appointed vice-president of Standard Co. of California, San Francisco. Mr. Davison has been general manager of Standard's El Segundo Calif. refinery.

• **John M. Garoutte** has been named work manager of the Permanente Cement Co. plant at Permanente, Calif. **Howard Church** succeeds Mr. Garoutte as work manager of Permanente Metals Corp.'s alumina plant at Baton Rouge, La.

• **Nat Levy** has retired as vice-president and secretary of Moody Dry Dock Co. of Oakland, Calif. after 42 years of service and succeeded as secretary by **Melvin G. Bartlett**.

• **Bruce E. Tau** has been elected vice-president of Freyn Engineering Co., Chicago. He has been identified with the company since 1930.

• **Frank E. Wartgow** has been elected vice-president and will be in charge of the newly-formed foundry division of Castle & Associates Inc., Chicago. Mr. Wartgow was formerly associated with the Whiting Corp. in their foundry equipment division.

• **Henry A. Rome** has been appointed manager of molded goods sales of the U. S. Rubber Co., New York, to succeed **F. W. Archibald** who is retiring after 40 years of service. Mr. Rome began his career with the company in 1915, and since 1931 he has been associated with molded goods department in Passaic, N. J.

• **Robert W. Lesman** has been appointed sales engineer in Indianapolis for the Cross Co., Detroit. Mr. Lesman joined the Cross Co. in 1946 after wartime service with the Navy.

OBITUARIES

• **Leon H. Marsh**, vice-president and secretary of the Kennedy Valve Mfg. Co., Elmira, N. Y., died recently. He joined the company in 1918.

• **Richard F. Jordan**, 62, vice-president in charge of sales for the Sterling Wheelbarrow Co., Milwaukee, died Apr. 5.

**JUST ONE
MINUTE!**

DO YOU
EVER CUT
KEYWAYS

DO YOU LIKE
SAVING MONEY
AS WELL AS
TIME?

DO YOU ENJOY
OWNING AND
USING A FINE
KIT OF
TOOLS?

in pulley hubs, gears, cutters, couplings, collars, etc.?

With a du Mont Minute Man Keyway Broach Kit and a du Mont, or other, Arbor Press you do the job, by hand, in one minute.

Users tell us their Minute Man Kits pay for themselves the first time or two they use them. No costly, time-consuming machine tool set-up. Everything's right there in the Kit to cut a wide range of keyway widths and depths.

See the Minute Man Keyway Broach Kits at your Industrial Distributor's. The precision broaches and bushings are beautifully made and finished and handsomely cased. You'll be proud to own one of these Kits. You'll enjoy using it every time you have a keyway to cut.

**DO YOU WANT REFERENCE DATA,
SPECIFICATIONS, PRICES?**

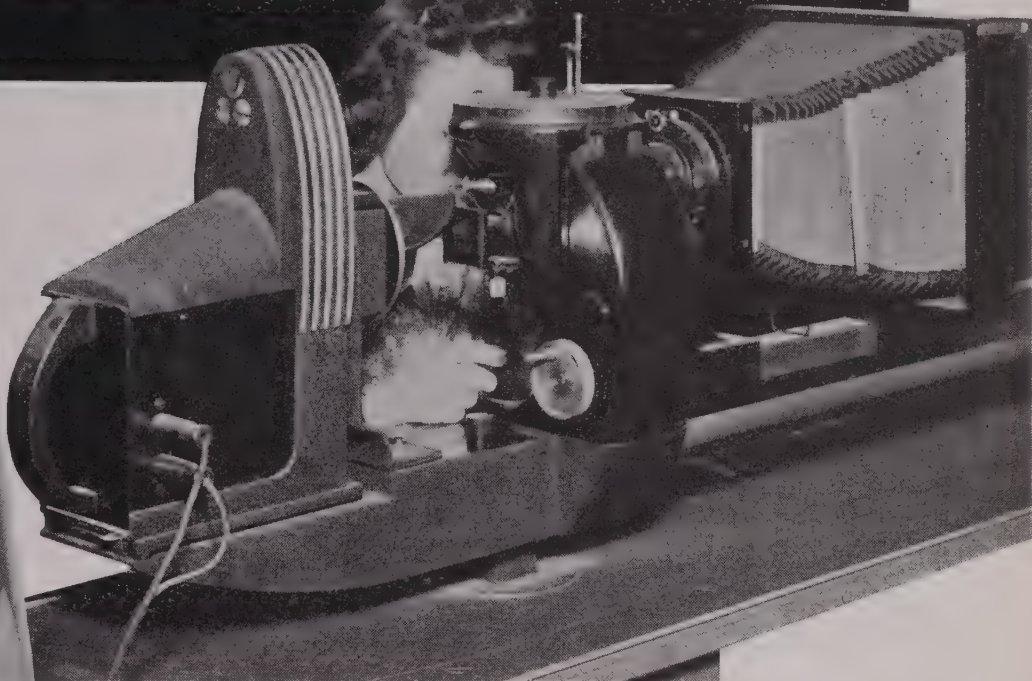
Just ask us to mail you the Minute Man Manual "R". You'll find it useful and interesting. Use the coupon.

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Please send me Descriptive Folder and Price List R

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CITY.....
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The du MONT CORPORATION GREENFIELD, MASSACHUSETTS

Here's why Makers of
COSTLY PRECISION INSTRUMENTS
can't afford any other method of fastening



...except AMERICAN PHILLIPS SCREWS

1. SAFETY IN PRODUCTION: Instrument assemblies that are worth up to hundreds of thousands apiece *can't* be left open to the threats of slipping, slashing, *slotted* screwdrivers . . . burred and split screwheads . . . uncertain and insecure fastenings. And that's why instrument-makers make sure to get the positive protection of modern American Phillips Screw-driving . . . the only method of driving screws automatically straight . . . because the 4-winged driver aligns itself with the American Phillips recessed-head screw . . . and can't be twisted out by high-speed power driving. Even on such assemblies, *time-savings run as high as 50%.*

2. SAFETY IN USE: In certain cases, instrument assemblies could no longer retain their original precision except for the exceptional vibration-resistance of American Phillips Screws . . . which turn up tight and flush *every time.* Now add to such basic advantages the handsome, modern look, characteristic of every American Phillips fastening, and you have extra selling power, as well as holding power . . . on anything from a spectrometer to a television set. Sum it all up, and it's plain to see that . . . every time . . . *American Phillips Screws cost least to use.* Yes, on your product, too! Write.

AMERICAN SCREW COMPANY, PROVIDENCE 1, RHODE ISLAND

Chicago 11: 589 E. Illinois St.

Detroit 2: 502 Stephenson Building

**AMERICAN
 PHILLIPS** *Screws*



ALL TYPES

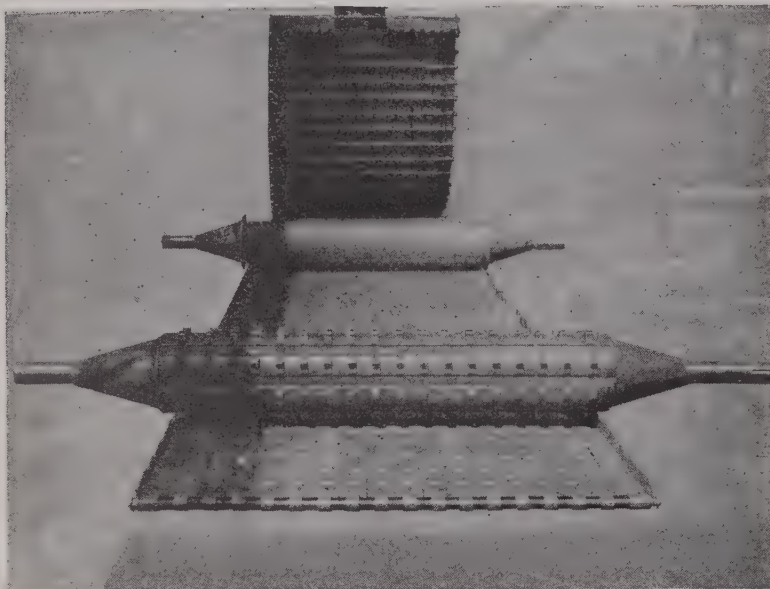
ALL METALS: Steel, Brass, Bronze, Stainless Steel, Aluminum, Monel, Everdur (silicon bronze)

**4-WINGED DRIVER CAN'T SLIP OUT
 OF PHILLIPS TAPERED RECESS**



DURALOY**DURASPUN**

HERE'S ONE OF OUR MORE DIFFICULT JOBS



It's a conveyor assembly for a heat-treating furnace, alloyed and cast for a large manufacturer of automobile parts. Perhaps you would be interested in some facts:

Alloying Elements . . . 15% Chromium, 35% Nickel
 Conveyor Belt 8,400 pounds, statically cast
 Head Shaft 1,625 pounds, centrifugally cast
 Tail Shaft 804 pounds, centrifugally cast

The belt consists of several thousand individual links assembled and held together by alloy steel rods. No machining of the links was necessary. The lugs on the head shaft were cast integrally with the shaft. The end cones on both shafts were cast statically and then welded on.

You may not need a conveyor for a heat-treating furnace such as this, but if you need any high alloy casting—for resisting heat, corrosion or abrasion—we would like to discuss producing it for you. Our experience in static castings goes back to 1922 and in centrifugal castings back to 1931, both pioneering dates.

THE DURALOY COMPANY

Office and Plant, Scottsdale, Pa. • Eastern Office, 12 East 41st Street, New York 17, N. Y.
 Los Angeles & San Francisco
KELSBY & HARMON
 Chicago & Detroit
J. A. CORNELL & ASSOCIATES
 METAL GOODS CORP.: St. Louis • Houston • Dallas • Tulsa • New Orleans • Kansas City

PERSONALS

• **Hugo F. Urbauer**, founder and chairman of the board of Midwest Piping & Supply Co., Inc. of St. Louis, died Mar. 25.

• **Joseph A. Wayne** died Apr. 5. He had been associated with Morrill Wheeler & Co., Inc., Philadelphia, for over 49 years, and was secretary of the board and general purchasing agent.

• **Harold A. Richmond**, chairman of the board and treasurer of the General Abrasive Co., Inc., Niagara Falls, N. Y., died recently.

• **G. A. Fritsch**, 52, manager, Pittsburgh sales district of the Vandium Corp. of America, died Apr. 1.

• **Noyce L. Cornell**, 50, product superintendent of the Dunlop Tire & Rubber Corp., Buffalo, died Apr. 6. He had been with Dunlop since 1924.

• **William C. H. Pfeil**, 68, former superintendent of the Manzel Brothers Co. plant in Buffalo, died Apr. 5. He retired 4 years ago.

• **John G. Schroeder**, 59, a director and assistant vice-president of Pratt & Lambert, Inc., died Apr. 5. He had been associated with the western division office in Chicago since 1906.

• **David Findlay**, former president of the L. S. Starrett Co., Athol, Mass., died Apr. 3. He had retired early in 1946.

• **Earl D. Rogge**, 53, product manager for the Meili-Blumbe Mfg. Co., New Holstein, Wis., died Apr. 4.

• **Roland F. Smith**, 44, vice-president, treasurer and general manager of the Waukesha Foundry Co., Waukesha, Wis., died Apr. 4.

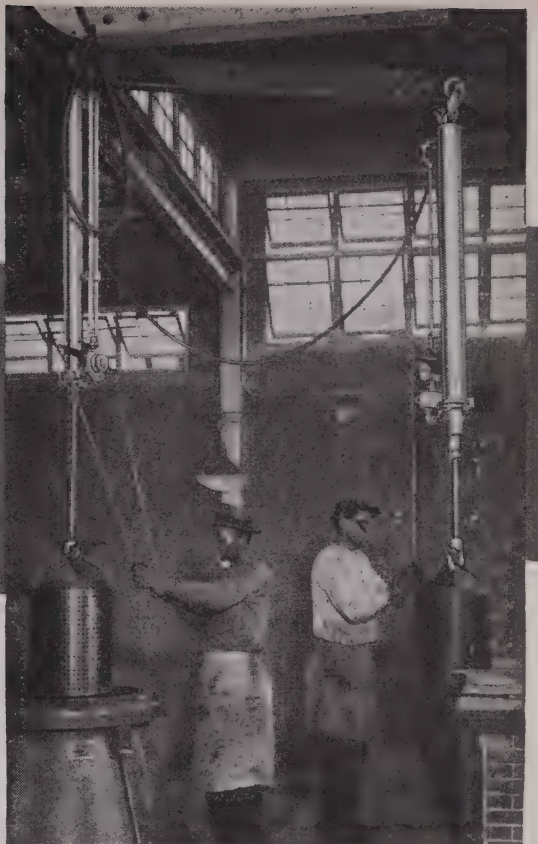
• **Alexander L. Bletz**, 53, plant engineer for a number of years for SKF Industries, Inc., of Philadelphia, died Apr. 1. For the past 2 years he had acted in an advisory capacity on plant engineering problems.

• **Paul M. King**, 66, vice-president in charge of sales, Worth Steel Co., Claymont, Del., died Apr. 15 after 30 years' association with the company.

• **M. W. Field**, comptroller of American Steel & Wire Co., Cleveland, died Apr. 19. Mr. Field had been associated with the Wire Co. as comptroller and director since 1919.

Get More Production Per Man with . . .

CURTIS AIR HOISTS



The speed, ease of handling and accurate control of Curtis air-powered Hoists and Cylinders step up production.

Wherever a lifting, pulling or pushing operation is involved, CURTIS Air Hoists save time and labor; cut load-handling costs.

Curtis Air Hoists provide:

- Low original cost
- One-man operation
- Immunity to abuse by overloading
- Capacities to 10 tons
- Light weight
- Lowest operating expense
- Finger-tip control
- Pendant, bracketed or rope-compounded types

*Send for Bulletin C-7 on Curtis Air Hoists,
Air Cylinders and Air Compressors.*

CURTIS

PNEUMATIC MACHINERY DIVISION

of Curtis Manufacturing Company

1948 Kienlen Avenue - St. Louis 20, Missouri

94 Years of Precision Manufacturing

CURTIS PNEUMATIC MACHINERY DIVISION of Curtis Manufacturing Company
1948 Kienlen Avenue, St. Louis 20, Missouri

H-594

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C-7 on Curtis Air
Hoists, Air Cylinders and Curtis Air
Compressors.

Name.....

Firm.....

Address.....

City..... Zone..... State.....

British Iron, Steel**Exhibit Shows Many
Improvement Devices**

The British Iron and Steel Research Association's exhibit at the Physical Society's exhibition in London demonstrates the wide field for instrumentation both in research and in operation in the iron and steel industry.

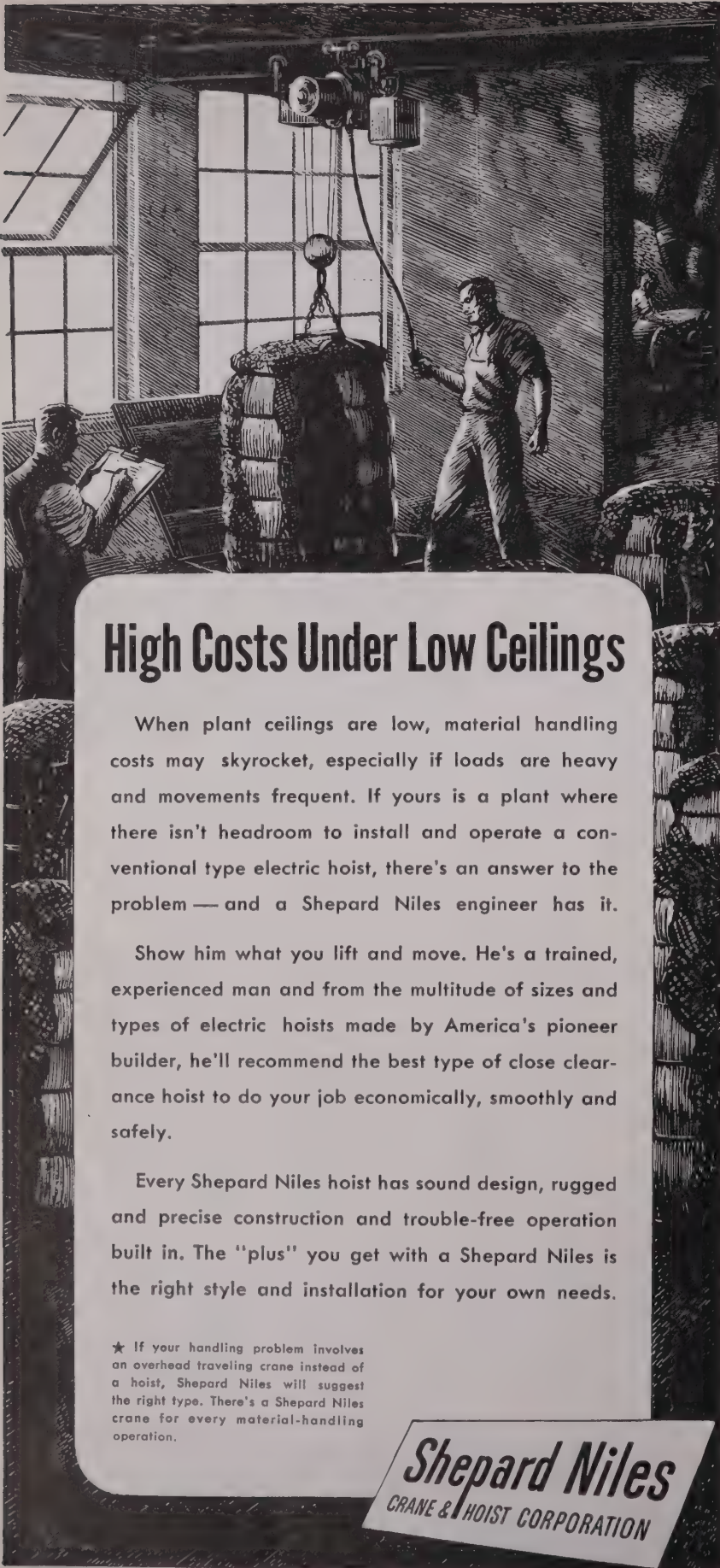
At the ironmaking stage an immersion pyrometer for molten cast iron is shown, designed to measure the temperature of liquid iron from the B. I. S. R. A.'s experimental blast furnace where the flow of iron is over within 15 secs. Radiation from the end of the silica sheath immersed in the molten metal is fixed upon a high speed thermopile.

At the steelmaking stage a potentiometer indicating roof pressure measurement is shown for open-hearth furnaces. The differential pressure between the atmosphere within and outside the furnace is registered by an electrical null balance technique measurement which readily lends itself to remote indication of readings in the form of an electrical signal. The differential pressure development on a free diaphragm is automatically balanced by the force set up on a current-carrying coil moving in a uniform magnetic field. The current in the coil at the balanced condition is a measure of the differential pressure applied.

Also applicable to the steelmaking stage is a carbon tube furnace which, by means of a carbon tube directly heated, provides a black body source 2" diameter for calibration of total radiation pyrometers. The temperature of the furnace may be varied from 1000 to 1750 deg. C. and thus affords a means of calibrating steelwork pyrometers in situ.

Such a pyrometer is the mirror type total radiation pyrometer as shown which, because of its compact size, can be mounted on the front wall of an open-hearth furnace. It is based on the ordinary thermocouple principle, but employs two thermocouples made of well-known alloys, and the junctions are located in the pyrometer casing, which is water-cooled so that the variation in the ambient temperature is a minimum.

The sulphur dioxide recorder shown also applies to the steelmaking stage, and is used for recording



High Costs Under Low Ceilings

When plant ceilings are low, material handling costs may skyrocket, especially if loads are heavy and movements frequent. If yours is a plant where there isn't headroom to install and operate a conventional type electric hoist, there's an answer to the problem — and a Shepard Niles engineer has it.

Show him what you lift and move. He's a trained, experienced man and from the multitude of sizes and types of electric hoists made by America's pioneer builder, he'll recommend the best type of close clearance hoist to do your job economically, smoothly and safely.

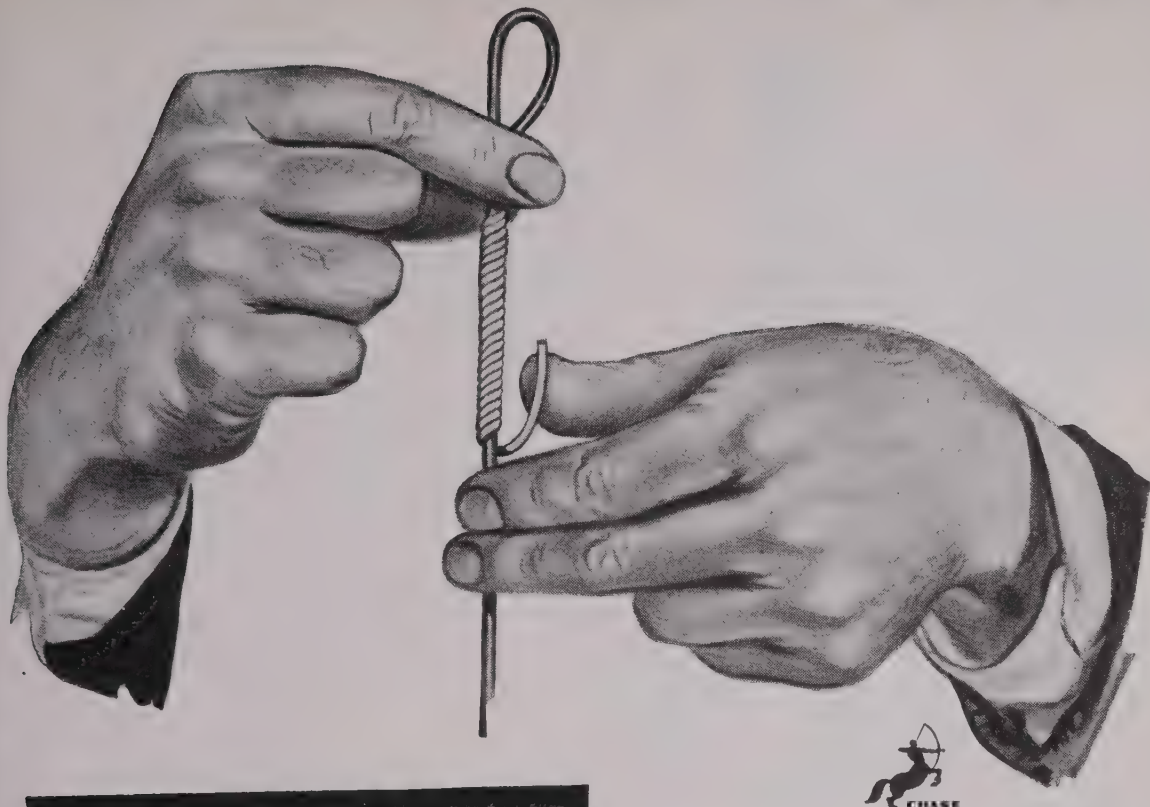
Every Shepard Niles hoist has sound design, rugged and precise construction and trouble-free operation built in. The "plus" you get with a Shepard Niles is the right style and installation for your own needs.

★ If your handling problem involves an overhead traveling crane instead of a hoist, Shepard Niles will suggest the right type. There's a Shepard Niles crane for every material-handling operation.

Shepard Niles
CRANE & HOIST CORPORATION

356 SCHUYLER AVENUE • MONTAUR FALLS, N. Y.

WATCH CLOSELY PLEASE!



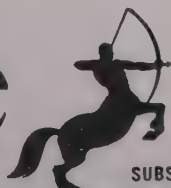
**...THEN
ORDER
YOUR WIRE
FROM
CHASE**

THIS is a test that all Chase copper-alloy wire produced for spring purposes must undergo before becoming a bona fide Chase product. It's a very critical one—which can be met only by wire of the highest quality—and consists of giving the wire a 360° coil or wrap around its *own* diameter to test its ductility and determine its physical qualities.

Every one of the 22 different types of wire alloys, regularly produced by Chase, must undergo tests that are just as rigid, or more so. And every one is carefully formulated, free from physical defects, perfectly "cast" for uniform uncoiling.

Don't compromise. Order the *best* wire from any one of the many Chase Warehouses and Service Offices from coast to coast.

Chase



the Nation's Headquarters for
BRASS & COPPER

WATERBURY 91, CONNECTICUT

SUBSIDIARY OF KENNECOTT COPPER CORPORATION

THIS IS THE CHASE NETWORK . . . *handiest way to buy brass*

ALBANY ATLANTA BALTIMORE BOSTON CHICAGO CINCINNATI CLEVELAND DETROIT HOUSTON INDIANAPOLIS KANSAS CITY, MO. LOS ANGELES MILWAUKEE MINNEAPOLIS
NEWARK NEW ORLEANS NEW YORK PHILADELPHIA PITTSBURGH PROVIDENCE ROCHESTER SAN FRANCISCO SEATTLE ST. LOUIS WATERBURY (Indicates Sales Office Only)

**You Need
MH*
to Save Space!**

* MH is MASS HANDLING—
the systematic movement of the
most units, in the shortest time,
at the lowest cost.



UNLOADER



PICTURE
YOUR PRODUCT
HERE

WHY ENLARGE YOUR PLANT
while there's plenty of space overhead
that can be put to work with Towmotor
Mass Handling? Systematic storage of
raw materials, equipment and products
in this unused overhead area will free
valuable floor space for productive work.
High stacking all types of materials and
products with Towmotor Fork Lift Trucks
and Accessories can save space in your
plant, expedite handling operations in
and out of storage. Check the advantages of Towmotor Mass Handling now.



SEND FOR FREE BOOK
"The Towmotor Fork
Lift Truck and Tractor
Guide" which describes
all Towmotor
Standard Products and
shows how Towmotor
Fork Lift Trucks save
space in your plant.

TOWMOTOR CORPORATION

Division 15, 1226 East 152nd St., Cleveland 10, Ohio
REPRESENTATIVES IN PRINCIPAL CITIES



TOWMOTOR

THE ONE MAN GANG

Fork Lift Trucks and Tractors

RECEIVING • PROCESSING • STORAGE • DISTRIBUTION

NEWS OF INDUSTRY

the SO_2 content of fuel and gases. In a steelworks, requirements of very high sensitivity fast response have to endure through long unattended periods in severe conditions. This new sign of SO_2 recorder meets the demands by converting SO_2 from a continuous sample into sulphuric acid in a countercurrent scrubbing tower. The electrical conductivity of the reagent is measured before and after absorption and the difference used to operate a recording millivoltmeter.

Instrumentation at more advanced stages is exemplified by a wiredrawing profilometer, and a portable roll force meter. This has been developed by B.I.S.R. rolling mill team at Sheffield. It records at a distance the vertical force between the rolls during the passage of the stock through the mill. That shown is capable of measuring loads up to 50 tons, is readily transportable to a work area where it may be installed in the course of an hour or so. These meters are being developed for loads up to 250 tons and more.

Wrought Iron "Boots" Protect Concrete Piles

Boston

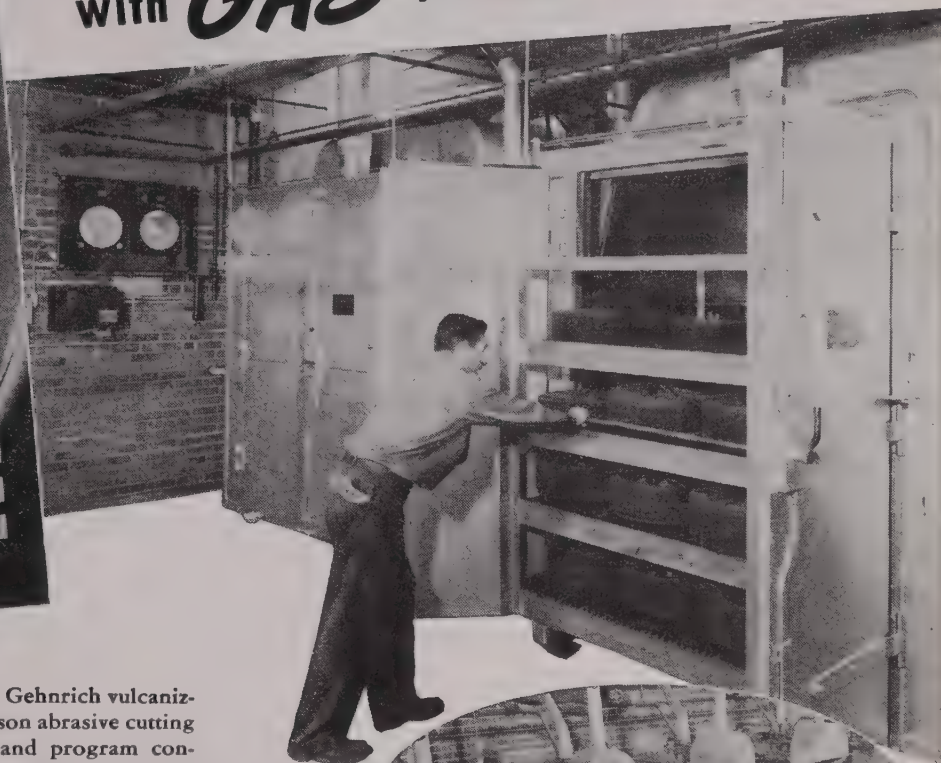
• • • Protective "boots" of wrought iron plate have been installed on badly spalled pre-cast concrete piles of two Massachusetts bridges to prevent further damage from water tidal action.

One, the Narrows bridge on U.S. Route 6 near Wareham, was built in 1938. The other, Bass River bridge on state route 28 near S. Yarmouth, was constructed in 1935. Rising and falling of the tides, plus alternate freezing and thawing and abrasion action of floating objects, have spalled the piles that on a few more than half the cross sections remained.

The "boots" for 90 piles of the two bridges were fabricated of 1/2-inch wrought iron plate 6 ft. long. The plates were bolted together, forming a 22-inch by 22-inch shield. At installation during low tide, the boots were back-filled with concrete.

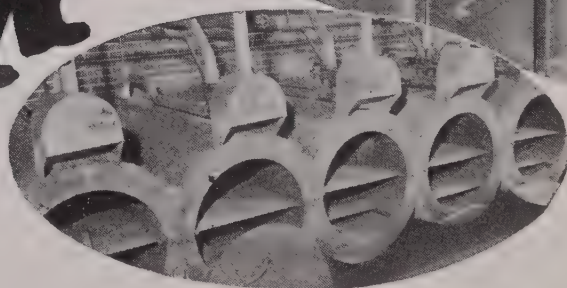
Use of wrought iron plate for pile application is based upon the tenacity of the metal to withstand sustained submergence in salt water and alternating wet and dry conditions of corrosion. Maintenance involving scaling and painting of the plate is unnecessary.

HEAT PROCESSING COSTS REDUCED 75% with **GAS** VULCANIZING OVENS



Charging one of the five Gas-fired Gehnrich vulcanizing ovens with a truckload of Allison abrasive cutting wheels. Note Bristol recorder and program controller which govern heat processing cycles.

Part of the battery of 21 steam jacketed ovens which were replaced with Gas-fired ovens.



COST REDUCTION is only one of the advantages in the use of GAS for heat processing at The Allison Company, Bridgeport, Connecticut.

In fact, the conversion to modern GAS Vulcanizing ovens resulted in the following important operating and product advantages, as well as in cost reduction:

- Improvement in the uniformity of the product
- Extension of research facilities to production basis due to accurate heat control
- Elimination of maintenance on steam piping and oven jackets
- Reduction in handling expense

Allison Abrasive Cutting Wheels are high-speed production tools made by bonding sharp abrasive cutting grains in discs with a vulcanized rubber adhesive. In that vulcanizing process GAS performs its vital function—supplies heat at the precise temperature and for the exact length of time required for perfect bonding.

Accurate temperature regulators and simple, time-cycle program controls, have eliminated the human element in the vulcanizing process—have convinced Allison Company executives that GAS, and modern Gas Equipment, really team-up to provide economical, dependable heat processing. Wherever you use heat in production processes there's a place for GAS; your local Gas Company Representative can assist you in applying modern Gas Equipment.

AMERICAN GAS ASSOCIATION

420 LEXINGTON AVENUE, NEW YORK 17, N. Y.



Youngstown Workers to Get Wage Adjustment

Youngstown

• • • Youngstown Sheet & Tube Co. will begin distributing more than \$2 million in wage adjustments to about 20,000 present and former employees early next month as result of a War Labor Board directive issued Nov. 25, 1944. Checks will go to about 13,000 in the Youngstown district and 7000 in the Chicago area.

Auditors, accountants and clerks have spent weeks preparing records to issue the checks which will range from a few dollars to several hundred dollars, depending on the amount of time worked on jobs for which adjustments are being made.

This will be the first of two distributions and may be followed by the second distribution later in the year.

Builds Wind Tunnels

Pittsburgh

• • • The Brazilian Aeronautics Commission has announced the purchase of \$300,000 worth of electrical equipment for two wind tunnels to be built at a new research center in Sao Dos Campos. The equipment was ordered through the Westinghouse Electric International Co. Heart of the man-made gales will be two 1600-hp electric motors, one for each of the tunnels. They will drive fans capable of generating up to 300 mph.

Dr. Arthur Amorim, of the Brazilian Aeronautical Commission, explained that one tunnel will be used for the development of commercial aircraft and the other for training young engineers. The test section of each tunnel will be 7 x 10 ft, he said, thus making it possible to work with models having a wingspread of 7 or 8 ft.

Pittsburgh Steel Sales Up

Pittsburgh

• • • First quarter sales of Pittsburgh Steel Co. increased to a level of \$22,200,000 compared with \$13,300,000 during the first 3 months of 1947, Joseph H. Carter, president, told stockholders recently.

The new blast furnace, which the Company recently purchased from War Assets Administration should be ready for operation early next month, he said. This operation will reduce by about 60 pct the company's requirements for present high priced scrap. Mr. Carter added

over **90%**
OF YOUR
MATERIAL HANDLING
REQUIREMENTS

can be met with
STANDARD EUCLID CRANES,

whether they are put to Special or General Purpose use. Standard Euclid Cranes are available in capacities of 3, 5, 7-1/2, 10, 15, 20 and 25 tons in various spans.

All detail parts are standardized and jig machined to assure interchangeability.

THE EUCLID CRANE & HOIST COMPANY
1361 CHARDON ROAD, EUCLID, OHIO

High grade, wide face, coarse pitch gearing.

Shafts short and heavy to withstand stress.

Anti-friction bearings throughout.



STOP WASTING DOLLARS

TRADE MARK REGISTERED
IKRANE IKAR

USERS: Chrysler, US Steel, DuPont, Lima Locomotive, Basic Magnesium, Pullman-Standard, Boeing, Lockheed, Ford, Bethlehem, General Motors, etc.



1 1/2, 2 1/2, 5 & 10 Ton Capacities

Silent Hoist & Crane Co.

851 63rd ST., BKLYN. 20, N. Y.

ON OBSOLETE MATERIALS-HANDLING METHODS

MODERNIZE! You can offset rising costs with **KRANE KAR**, a power-swinging boom Crane that is small, compact, will travel to any part of yard or plant. Loads and Unloads freight cars, trucks, trailers... Tiers and Stores... ideal for Maintenance and Repairs. **KRANE KAR** will transport any load it can lift and with its power-swinging, power-topping features spot the load with fine precision at destination. **KRANE KAR** does the work of 6 or 8 men, handling materials at cost of 8c a ton (case histories on request).

Pneumatic or solid rubber tires; 9 to 37 ft. booms or adjustable telescopic booms; gasoline or Diesel. Electric magnet, clamshell bucket, and other accessories available. Ask for Bulletin #69.

Don't
smash
it!



Use a ROBERTSON COOL-CUT

your grinding wheels peen or chatter the work? Because of the revolutionary open structure of a Robertson Cool-Cut Wheel, the grains penetrate, and remove the metal cleanly from the stock. You'll find that a Robertson wheel performs better than a more close-grained conventional wheel; cuts faster; and . . . as hundreds of users have proved . . . has a longer life-expectancy.

You will be interested in the results that can be obtained using a Robertson Wheel. Typical is the experience of a manufacturer of motor shafts who, in removing .015" to .020" stock from S.A.E. 40 steel ground to a tolerance of plus .001" minus .000", was able to finish only 10 pieces per wheel-dressing. By replacing the conventional wheel with a Robertson RA 464-MV, and with no other change in grinding method, production was

immediately increased from 10 to 30 shafts per wheel-dressing!

Even if you are satisfied with your present wheels, it may surprise you to find what Robertson precision-built wheels can do. Robertson Resinoid and "Cool-Cut" Grinding Wheels, Mounted Wheels and Segments are made to tackle the toughest jobs. Blueprint your grinding problems . . . and let us recommend wheels that will solve them.



ROBERTSON MANUFACTURING COMPANY
TRENTON 5, NEW JERSEY

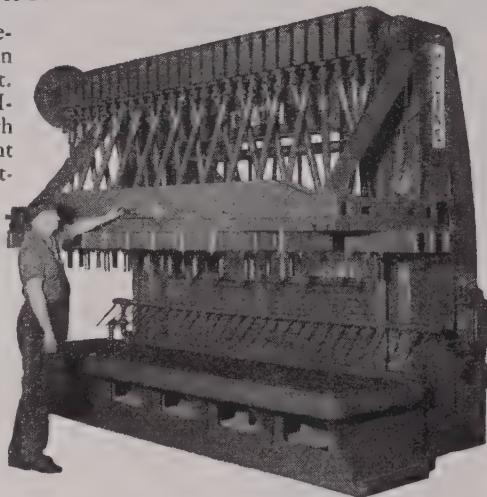
Resinoid and Vitrified-Bonded Grinding Wheels • Mounted Wheels • Segments



- ★ At greater Man-Hour **SAVINGS**
- ★ At higher rated **EFFICIENCY**
- ★ At finer, effortless **PRECISION**

A Moline Multiple Spindle Specially Designed Machine Tool can do your job better at less cost. Ruggedly built to fit your **INDIVIDUAL** requirements in such operations as Boring — Straight Line Drilling — Universal Adjustable Spindle Drilling — Honing — Tapping — Reaming — Counterboring — Special Milling — these machines are based on years of experience accumulated since 1901.

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SPEED**



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Get on with production. Do your snagging quicker, cleaner, *safer!* With **Electro HIGH SPEED SNAGGING WHEELS** engineered to your job, you'll see costs come down and volume of *better output* go up. These wheels work on anything from anything—swing frames, floor stands or portable machines. Full details illustrated in full color in our new Grinding Wheel Manual No. 645. Send for it now. It's free.

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344 DELAWARE AVENUE (GRINDING WHEELS) BUFFALO 2, NEW YORK

NEWS OF INDUSTRY

Reports on Safety of Sodium Fluoride in Furnace Operations

Washington

• • • Use of sodium fluoride in steel pouring operations in open-hearth furnaces does not constitute a health hazard, it will soon be revealed in a forthcoming report by the Public Health Service.

However, the PHS will declare, such operations do produce an irritating smoke which causes an inflammatory condition of the nose and throat. Steel companies will be urged to develop smoke-control methods as well as a possible substitute mold coating material.

While the department report will be based on a study made in four plants of the Republic Steel Corp.—Canton, Youngstown, Warren and Cleveland—it believes that the findings also apply to similar operations of other steel firms.

These studies and analysis were made in January at the joint request of the USW and the Republic officials. Medical, oral and X-ray examinations were made of 350 workers during the course of the study.

"Analysis of the air and dust samples show that workers are not exposed to hazardous concentrations of sodium fluoride or other fumes," the department says. "However, at the time the molds are lined with pitch and tar, the smoke produced is exceedingly irritating."

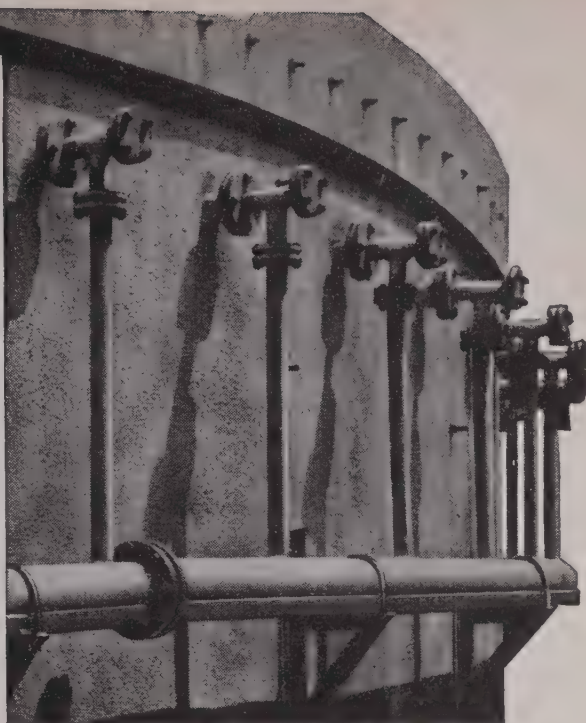
"The same is true later when molten metal is poured," it was added. "Radiant heat is also excessive. However, examinations of the workers showed no changes which could be attributed to use of sodium fluoride."

British Government May Exploit Some Inventions

London

• • • The Government has introduced in the House of Lords the Development of Inventions Bill providing for the setting up of a corporation to acquire, develop and exploit inventions which, in its opinion, are not being adequately developed and exploited. The National Research Development Corporation, as it will be called, will have immediate borrowing powers of \$1,000,000 and the Board of Trade may within five years advance up to \$20,000,000.

Go Lead for Acid Piping



When installing acid pipe lines for long, trouble-free service, go for a material that stays on the job. **Go National for Lead!**

Lead has proved itself the accepted corrosion-resisting material for acid conveying. National Lead gives you all of lead's advantages, engineered into acid pipe and fittings that withstand elevated or fluctuating temperatures, pressure, vacuum and vibration.

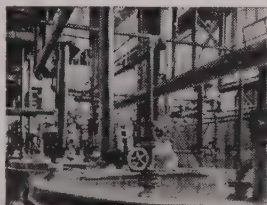
Here are three types ready to help you fight acid corrosion and mechanical stress:

All-Lead Pipe: National's chemical Lead Pipe is widely used throughout industry. Of practically pure lead, substantially free of bismuth, it contains small amount of copper, which boosts corrosion resistance and endurance limit. The extrusion process used in fabricating this pipe assures uniform wall thickness, free flow, and freedom from porous or defective spots.

This is our *regular* lead pipe. It has become "standard" in many industries. Other useful types are made by alloying small amounts of other metals with chemical lead.

For example, our Tellurium Lead Pipe gives you *extra* corrosion resistance at high temperatures . . . *greater* tensile strength and toughness . . . *higher* endurance to vibratory stress.

Or, if you need *extra* resistance to erosion, there's also our Antimonial Lead Pipe. This is made with a base of either chemical or Tellurium Lead. By adding 6% of antimony, tensile strength is almost doubled and hardness and stiffness are greatly increased.



All industry knows the dependability of lead for acid handling. Here are Chemical Lead Pipe and Fittings used with a battery of digestors.

2 Cold Expanded Lead-Lined Pipe: Here's lead pipe plus the strength of iron or steel. It's our "United" Lead-lined Cast Iron or Steel Pipe. *Outside* you have all the strength needed to stand pressure or other mechanical stress; *inside*, the ability to resist corrosion.

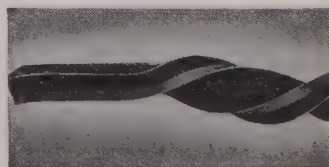
Lead's corrosion resistance plus the strength of steel! "United" Lead-lined Pipe brings you both.

The lead lining is formed in continuous lengths of seamless pipe, then cold-expanded against the inside of the iron or steel tube. You get a tight fit and a smooth, uniform lining, free of defects. All iron and steel pipe used meets ASTM standards.

3 "United Tubond" Lead-Lined Pipe: For handling corrosive liquids or gases at extremes of temperature, pressure, vacuum or vibration, we recommend our "United Tubond" Lead-lined Pipe. This is steel or wrought iron pipe with its lead lining permanently bonded to the ferrous metal. No separation or creep is possible. The toughness of the bond is demonstrated by the illustration below.

All our lead-lined pipe is available in flanged sections, with the lead lining carried over the face of the recessed flange. This insures a positive lead-to-lead seal at each flange, eliminating any leakage at joints.

Bonded for keeps! Once bonded . . . "Tubond" Lead-lined Pipe stays bonded. Even severe twisting can't break the bond.



Go National for Lead

. . . pipe . . . valves . . . sheet . . . lead-lined or lead-covered equipment . . . even complete acid recovery plants. Behind every National Lead recommendation, every National Lead product, are years of experience and many important installations in every field handling corrosive liquids and gases.

NATIONAL LEAD COMPANY

111 BROADWAY, NEW YORK 6, N.Y.

Offices and Plants in Principal Cities

Pacific Coast: Morris P. Kirk & Son, Inc., Los Angeles

Canada: The Canada Metal Company, Ltd., Toronto



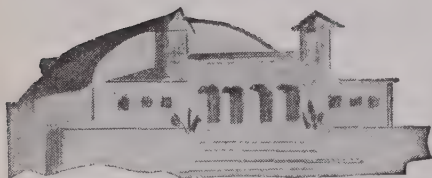
ATLANTIC CITY

by-the-sea

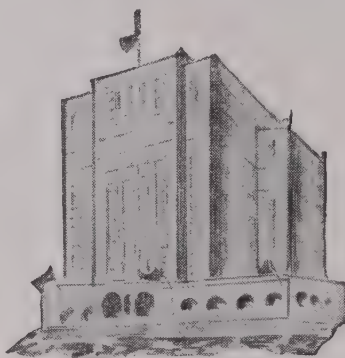
June 28 to July 1

INDUSTRIAL FINISHING EXPOSITION

A comprehensive exhibit of equipment and supplies for manual and automatic electroplating, polishing and buffing, cleaning and degreasing, tumbling and burnishing, enameling and lacquering, and allied processes. Of interest and value to all manufacturers concerned with metal surface treatment.



Make plans now to attend the Exposition and the A.E.S. Annual Convention and Technical Sessions. Exposition in Atlantic City's Convention Hall; Convention Headquarters in Ambassador Hotel. Sponsored by the A.E.S. Newark Branch.



For further information, write

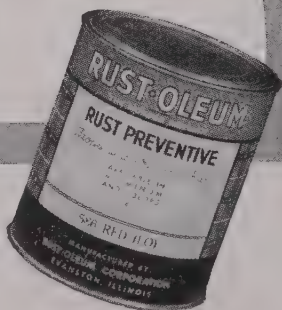
AMERICAN ELECTROPLATERS' SOCIETY
National Office, P. O. Box 168, Jenkintown, Pa.

RUST-OLEUM

Stops Rust!

Rust-Oleum rust preventive gives lasting protection to metal roofs, stacks, tanks, structural steel, equipment, machinery, boilers, etc. It seals metal with a tough, enduring coating that defies rain, snow, dampness, brine, salt air, etc. Maintenance costs are cut because Rust-Oleum lasts longer, goes on quicker, and requires no extensive surface preparation.

Rust-Oleum can be applied directly over rusted metal. It penetrates the rust and incorporates it into the protective film. No sandblasting, flame cleaning, or chemical dissolvers are necessary. Just wire brush away scale and apply.



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Third Quarter Export Allocation of Tinplate To Total 108,000 Tons Washington

• • • Third quarter exports of tinplate will total 120,000 net tons, of which 108,000 tons will be earmarked for rated export allocations, the Commerce Dept. indicated following meetings of its Tinplate Industry Advisory Committee and Tinplate Export Advisory Committee.

Departmental officials pointed out that the rated figure of 108,000 tons represents a reduction of 4000 tons from second quarter quotas. Of the proposed third quarter tonnage, 33,064 net tons will go to Latin American countries, with the balance earmarked for other nations. (See accompanying table).

Certified steel export priority ratings (CXS) must be accepted by U. S. tinplate producers and must accompany the government-approved foreign orders.

At the same time, the department approved the licensing on a non-rated basis of an additional 12,000 tons of tinplate of which 5000 tons would be earmarked for the packing abroad of foodstuffs to be imported into the U. S. The remaining 7000 tons are scheduled for uses permitted by the tin conservation order, M-43.

Steel producers earlier had told the Commerce Dept. that the coal strike had reduced tinplate production but added that the industry hoped such losses could be recaptured in early forward planning. The program, according to Frank McCue, IAC presiding officer, "still falls substantially short of the objectives desired in connection with foodstuff preservation abroad."

TINPLATE COUNTRY QUOTAS

Third Quarter 1948

LATIN AMERICA

Argentina	8,500
Bolivia	200
Brazil	9,400
Chile	3,000
Colombia	700
Costa Rica	23
Cuba	4,500
Dominican Republic	150
Ecuador	50
Guatemala	30
Haiti	23
Mexico	3,100
Nicaragua	35
Panama	50
Paraguay	30
Peru	1,000
El Salvador	23
Uruguay	1,050
Venezuela	700
British Meat Pack	500
Total Latin America	33,064

NON-LATIN AMERICA

Australia	10,500
Austria	500



Cloud-soft KIMPAK shields this unwieldy dispenser from damage during shipment. Photo courtesy Temprite Mfg. Co., Inc.

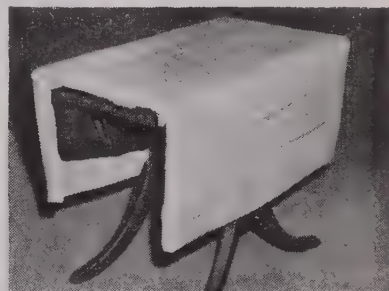
Kimpak* Float Packaging

**bundles of protection
for every product you pack**

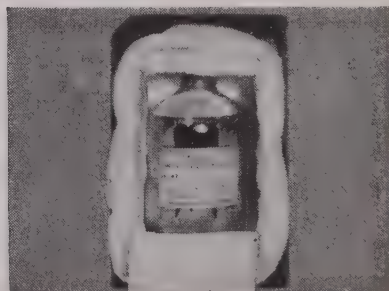
Ship confidently and save—thanks to reliable, low-cost KIMPAK* creped wadding. A versatile, efficient cushioning material, KIMPAK provides protection in packaging for the smallest, most delicate items to heavy and bulky products. Made in a variety of types, thicknesses and backings to suit your particular needs. You'll find a specification of cushiony KIMPAK to meet every requirement of the Four Basic Methods of Interior Packaging—Sur-

face Protection, Blocking and Bracing, Flotation Packaging and Absorbent Packaging.

Soft, flexible and feather-light—KIMPAK adds little weight or bulk to shipments. It is made either liquid absorbent or liquid repellent. Highly resilient, it effectively withstands shock and vibration. Spotlessly clean, KIMPAK improves the appearance of any package. No wonder so many fine products are wrapped for market with KIMPAK.



Surface Protection—Drop-leaf table. Photo courtesy Phoenix Chair Company.



Flotation Packaging—Mercury bottle. Photo courtesy F. W. Berk & Company.

Free book for you. Call or write your local distributor for this fact-filled booklet on better packaging methods. He is listed in the Classified Phone Directories. Or, if you wish, merely mail this coupon.

.....
KIMBERLY-CLARK CORPORATION
Creped Wadding Division, Neenah, Wis.

Please send me the free KIMPAK booklet on better packaging methods. IA-548

Name

Firm

Type of Business

Address

City, Zone, State

Kimpak

REG. U.S. PAT. OFF. & FOREIGN COUNTRIES



CREPED WADDING

T. M. Reg. U. S. & Can. Pat. Off.

THE IRON AGE, May 6, 1948—165

Weldimatics



WELDING TORCH W-45

Strong and sturdy, 14 inches long, yet weighs only 17 ounces. Lock control for continuous welding. Cuts oxygen and acetylene costs one-third.

BLOWPIPE C-47

Aluminum alloy construction... good balance, comfortable grip. Closed hand releases gas... open hand cuts it off. Reduces idle flame fire hazard. Works perfectly with natural gas, manufactured gas, butane and compressed air.

WELDING TORCH W-46

Has long lever for closed hand or fingertip gas control, allows wider operating range. Weight, 14 ounces; length, 13 inches.

Meet all Underwriters Requirements

Weldimatics

... are daily cutting costs, reducing fire hazards in many of the world's largest industrial plants. Some distributor territory still available. Write today for descriptive bulletin.

992 OAKMAN BLVD.

Weldit
INC.
SINCE 1918

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SELF LOCKERS



Reg. U. S. Pat. Off.



PAT'D AND
PATS. PEND.

SOCKET SET SCREWS

WITH THE KNURLED CUP POINT

("The screw that won't shake loose")

This Knurled Cup Point "Unbrako" is a "Fastener" that positively won't shake loose.

A loose Fastener invariably causes shut-downs, loss of production and increased costs, all of which this "Unbrako" prevents.

This is how: That Knurled Cup Point digs-in, stays dug and holds tight, regardless of the most chattering vibration. Incidentally, the "Unbrako" Self-Locker can be used again and again. In sizes from #4 to 1-1/2" in diameter — full range of lengths.

"Unbrako" Screw Products can also be furnished in Brass, Stainless Steel, Monel, Bronze or whatever your requirements may be.

Ask for your copy of the "Unbrako" Catalog.

Ask us for the name and address of your nearest "Unbrako" Industrial Distributor.

Knurling of Socket
Screws originated with
"Unbrako" in 1934.

OVER 45 YEARS IN BUSINESS

STANDARD PRESSED STEEL CO.

JENKINTOWN, PA., BOX 523 • BRANCHES: BOSTON • CHICAGO • DETROIT • INDIANAPOLIS • ST. LOUIS • SAN FRANCISCO

Belgium	4,500
Belgian Congo	100
China	2,100
Denmark	1,800
Eire	225
Ethiopia	20
France	3,250
French Possessions:	
Fr. Equatorial Africa	25
Fr. Indo China	425
Fr. North Africa	3,600
Fr. West Africa	225
Madagascar	625
New Caledonia	50
Greece	900
Hong Kong	125
Iceland	22
India	2,000
Italy	2,800
Jamaica	25
Japan	1,000
Malaya (British)	175
Middle East	1,500
Netherlands	9,500
N. East Indies	1,200
Newfoundland	60
New Zealand	1,200
Norway	4,700
Pakistan	1,000
Philippine Islands	1,800
Portugal	3,500
P. West Africa	150
Siam	75
South Africa	6,300
Spain	750
Sweden	3,750
Switzerland	3,150
Trieste	70
Turkey	1,000
Contingency	36
Total Non-Latin	74,936
Total L. A. & Non-Latin	108,000

NOTE: In addition to the above amounts of rated tinplate, 5000 tons of unrated tinplate will be licensed for use in connection with the preservation of food to be imported into the United States, and 7000 unrated tons of either tinplate (.50 lbs electrolytic tin coating) or special coated manufacturing ternes may be licensed for use in connection with end uses permitted under Tin Conservation Order M-43, including use abroad by petroleum companies.

Industrial Commission Issues Digest of Laws

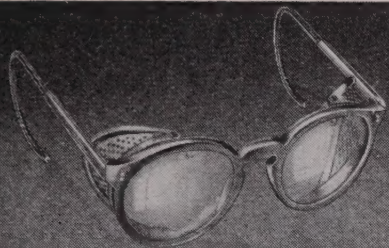
Providence

• • • The Rhode Island Industrial Commission has issued a concise, readable digest of laws pertaining to that state's industries. It is primarily for industrialists desiring to locate in that state who desire full and complete information on laws under which they would operate. It has an added value in that it keeps Rhode Island industrialists informed on general provisions of legislation governing their operations.

The nucleus of the Rhode Island digest was a part of a compilation of New England legislative data for the New England Council. That work has proved so useful, the Rhode Island commission has brought material pertaining to the state up to date in form suitable for general distribution.

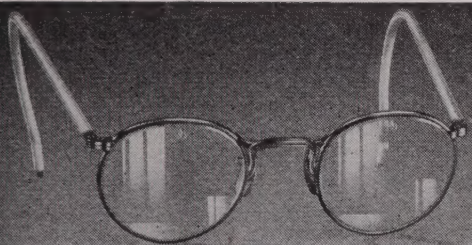
Digest is divided into five parts: first, organization, supervision and dissolution of business corporations. Second, protection of the public health, third, labor, fourth, taxation, fifth, social security.

n AO SPECTACLE SAFETY GOGGLES

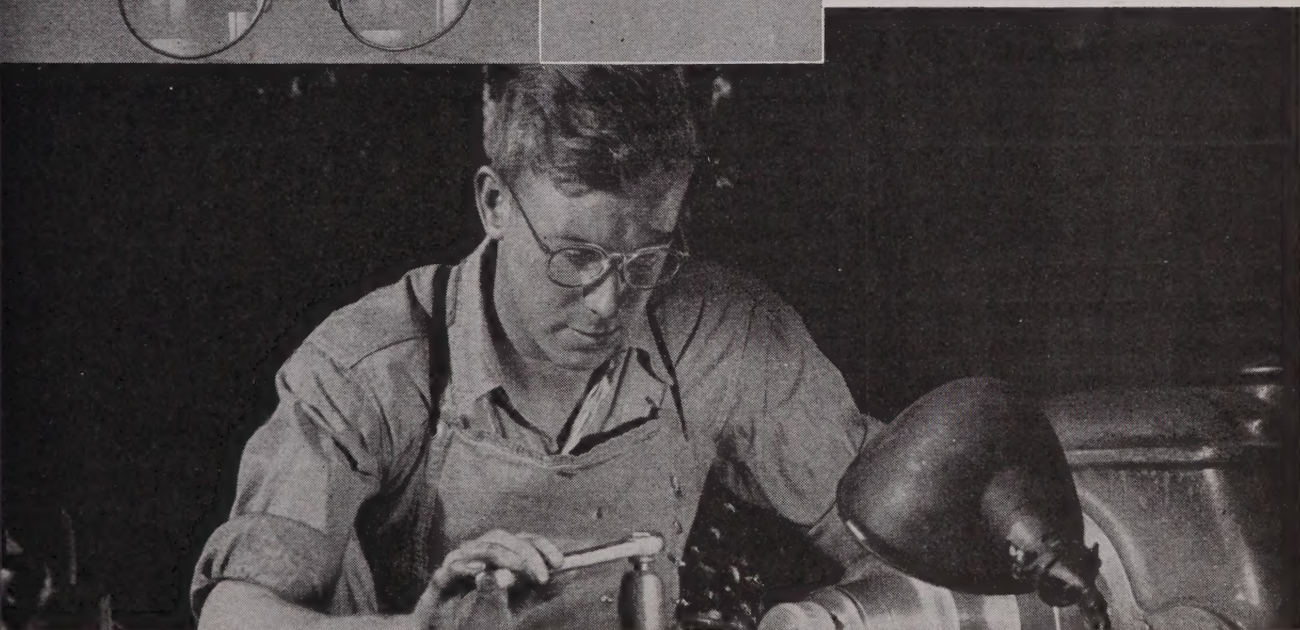


**AO ACETATE
SAFETY GOGGLES**
(Non-flammable cellulose
acetate butyrate)
Especially recommended
for chemical and electrical
work and similar opera-
tions where sparks may
cause fire or explosion.

Whether You Choose Acetate or Metal Frames



**AO METAL
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You'll Be Sure of Dependable Safety

Whether you prefer AO Acetate or Metal Spectacle Safety Goggles, 6 Curve Super Armorplate Lenses assure you of dependable safety. In addition, you get the *plus values* of UNOBSTRUCTED VISION, MAXIMUM COMFORT AND SMART APPEARANCE! In both the AO F-9200 Series Acetate Goggles and the F-3100 Series Metal Goggles, men work *safely* and more *efficiently*. High set end-pieces take hinges and temples out of the line

of sight, provide a clear view of the work without obstruction. Ventilated side shields give extra protection on jobs where foreign particles may strike laterally.

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Just as a famous chef jealously guards the recipe for his masterpiece, so we guard the formula for *Strenes Metal*. That's why no other foundry produces *Strenes Metal* castings.

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NEWS OF INDUSTRY

**Less British Steel for
Engineering Industries**

London

• • • The government has discovered that considerably less steel will be available for use in the engineering industries this year than would be required to meet the export targets laid down by Sir Stafford Cripps last September. Some of these targets have been found to be unrealistic and many of them in the engineering and vehicle groups have been substantially reduced.

The possibility of increasing other targets is limited by the requirements of the home market or the inability of foreign markets to absorb more of the goods in question. The national target for the end of 1948 has been reduced from 160 to 150 pct of the volume of 1938 exports. The target for iron and steel manufactures exported as such has been left unchanged but there are substantial reductions in the machinery field, farm machinery especially. The monthly target for private motor cars and commercial vehicles has been reduced from \$50,400,000 a month at end-1948 prices to \$36,000,000. To make up for these reductions, great hope is held of expanding the exports of textiles, especially for cotton goods.

Pig Iron Output Drops

Toronto

• • • Canadian pig iron production for January showed a decline from the month immediately preceding and also was well below the high record made in January 1947. For January, production totaled 160,042 net tons, or 69.9 pct of total rated capacity, and compares with 165,551 tons for December when the rate was 72.4 pct, and with 177,313 tons for January 1947. In the month under review output included 134,110 tons of basic iron, of which 125,264 tons were for further use of producing firms and 8846 tons for sale; 19,517 tons of foundry iron with 650 tons for further use and 18,867 tons for sale, and 6415 tons of malleable iron, all for sale.

Blast furnace charges in January included 316,842 tons of iron ore; 18,268 tons of mill cinder, scale, sinter, etc., and 5101 tons of scrap.

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Weights less than one half as much as previous models, insuring one-man operation.

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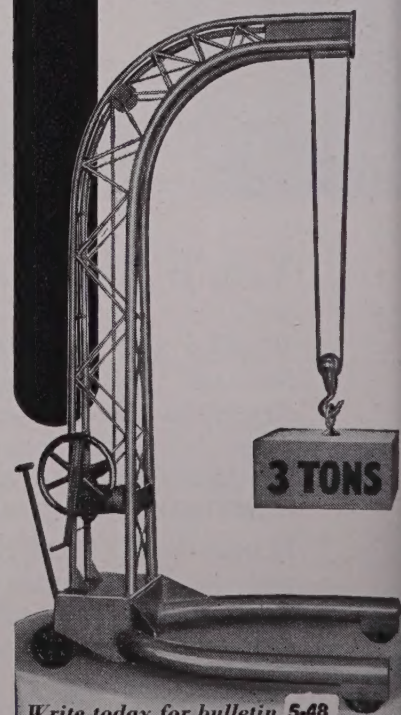
Adjustable tension handle provides additional leverage for heavy lifting.

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**"CANTON" DIVISION
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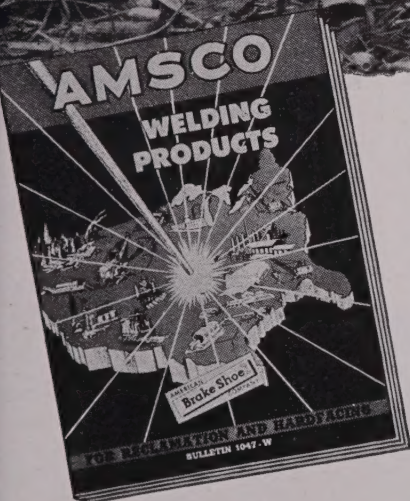
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Every equipment and machine part consigned to the scrap pile leaves its "red ink" mark in your ledger: the cost of replacement, the paralyzing of equipment while waiting for hard-to-get parts, the slow down of the job you're handling. This new welding products bulletin shows how to keep equipment producing by keeping parts out of the scrap pile with Amsco Conservation Welding.

All Amsco welding products are developed solely for the reclamation, rebuilding, repairing, and hardfacing of equipment parts subject to wear. For a fraction of replacement costs, damaged or worn parts can be restored quickly to full usefulness; or new parts can be protected before use to multiply their ordinary service life many times.

Take wasteful scrap piles off your list of "necessary evils", and wherever impact, abrasion, and frictional wear are cutting into your profits put Amsco cost-cutting welding products to work. Send for free Bulletin 1047-W today—it's a complete, fully illustrated guide to WHAT welding rod or electrode to use.



FREE!! New Amsco Welding Products Bulletin 1047-W

Gives complete characteristics and specifications for each welding rod or electrode. Over 90 drawings and on-the-job photographs show ingenious shortcuts. Handy alphabetical index gives, for each major field, the exact rod for almost every specific application. (Available soon: Bulletin on Amsco Tungsten Carbide welding rods, electrodes, inserts and bulk metal.)

AMERICAN

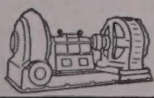
Brake Shoe

COMPANY

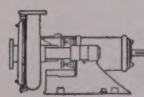
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Says Automobile Body Costs Have Increased 60 Pct Since 1941

Detroit

• • • The cost of automobile bodies has increased 60 pct since 1941, it has been disclosed in the annual report to stockholders of Briggs Mfg. Co., Inc.

The report indicates that steel shortages although persisting during 1947 were not as acute as during the previous year. During the year 1947 Briggs operations consumed 568,576,000 lb of steel, exceeding 30,862,000 lb the amount of steel processed during 1941. The report shows that the company planned to process 20 million lb more steel during 1947 than were actually consumed.

A stepped-up rate of production during December when Briggs' output hit its peak helped to account for the fact that steel consumed for automotive use during 1947 exceeded by almost 4 million lb the amount of steel received during the year.

"The huge demand for steel makes it necessary to operate on a hand-to-mouth basis of many items and requires much production ingenuity in stretching the available supply to meet current operating schedules," the report stated.

It is explained that more presses and tool and die men are required than in the prewar period when the materials flow was more regular. In the largest Briggs plant, for example, in 1941 there was one die setter for every 15 press operators. The number of press operators has increased 50 pct over the prewar total, it is reported. At the same time the number of die setters has more than doubled, the present ratio being one die setter for every ten press operators.

Extra die setters are required, the report explained, for the more frequent die settings that are necessary under today's operating conditions. The length of the press run on a stamping die has been curtailed one third to one half what it was before the war. Prewar press time of 15 days on a die is now cut to 6 or 8 days.

Briggs plants required 40,360,000 lb of enameling iron during 1947 for the production of formed plumbing fixtures. This is more than double the 1941 figure and nearly 50 pct greater than the 1946 total. Briggs estimates it will need 48,500,000 lb of enameling iron in

1948 for its projected deliveries of plumbing fixtures.

According to the 1947 report Briggs' earning record for the 12 month period reached an all-time peacetime high of \$204,831,337. Net income was \$7,512,156, equal to \$3.8 per share.

Ratio of net income to gross income in 1947 was 3.6 pct or slightly higher than the 1946 ratio. The ratio of net income to gross income in 1940 was 5.9 pct and in 1941, the corresponding figure was 4.3 pct of gross income, the report stated.

Briggs' payrolls during 1947 reached an all peacetime high of \$74,461,439 in wages and salaries, 36 pct of the total income for the year. The bill for wages and salaries was 35 pct greater than 1946.

During the year 1947 a total 543,526 man-hr was lost on account of labor stoppages in Briggs' plants.

Revised Enameled Steel Utensil Standards Out

Washington

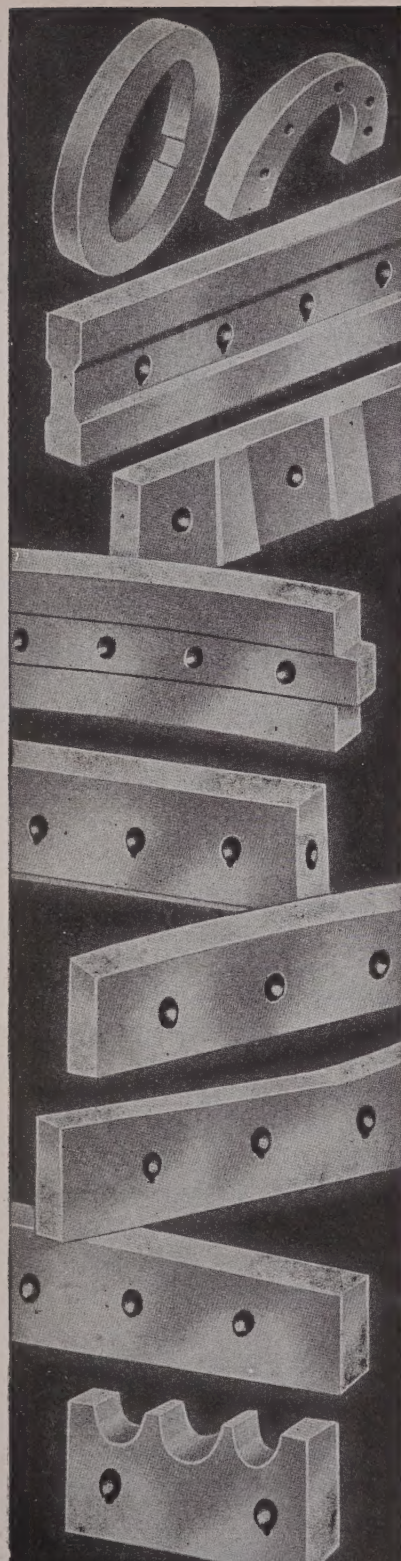
• • • Printed copies of the latest revision of the Commercial Standard for Porcelain-Enameled Steel Utensils (CS100-47) are now available according to an announcement by the Commodity Standards Division of the National Bureau of Standards.

This voluntary standard covers enameled utensils intended for cooking, household, food storage and hospital uses. It includes requirements for resistance to impact, boiling acid, and thermal shock, as well as tolerances on capacity, and detailed methods of test.

The present edition was developed by the trade pursuant to a proposal by the Enameled Utensil Manufacturers Council, based on the results of the council's continuing research program at the University of Illinois. As compared with the preceding edition (CS100-44), it provides for the testing of all shapes and sizes adaptable to the present test apparatus, rather than just the standard 2-qt pan previously specified.

Provision is made, through use of a compliance statement, for the manufacturer or distributor to label in conformity with the standard.

Copies are for sale by the Superintendent of Documents, Government Printing Office, Washington 25, for 10¢ each. A discount of 10 pct will be allowed on an order for 100 or more copies.



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